

COMMONWEALTH OF MASSACHUSETTS



CONTRACT DOCUMENTS AND SPECIAL PROVISIONS

PROPOSAL NO.	613915-128373
P.V. =	\$5,279,395
PLANS	YES

**FY 2025 CAPITAL IMPROVEMENT PROGRAM
FEDERAL AID PROJECT NUMBER 69A36523420000RLDMA
EAST DEERFIELD YARD INTERMODAL PROJECT**

December 30, 2024

This proposal to be electronically opened and read: Monday, December 30, 2024 @ 2:00 P.M.

FY 2025 CAPITAL IMPROVEMENT PROGRAM

EAST DEERFIELD YARD INTERMODAL PROJECT

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MASSACHUSETTS DEPARTMENT OF TRANSPORTATION RAIL AND TRANSIT DIVISION

NOTICE TO BIDDERS

Electronic proposals for the following project will be received through the internet on www.commbuys.com ("COMMBUYS") until the date and time stated below. No paper copies of bids will be accepted. Apparent bid results will be posted on COMMBUYS shortly after the bid submission deadline. All bidders must have a COMMBUYS account in order to bid on this project. If bidders are not currently registered with COMMBUYS, it is recommended that bidders register with COMMBUYS at least seven days prior to the scheduled bid opening.

MONDAY, DECEMBER 30, 2024 at 2:00 P.M.

EAST DEERFIELD

Federal Aid Project Number 69A36523420000RLDMA

East Deerfield Yard Intermodal Project

PROJECT VALUE = \$5,279,395

The Massachusetts Department of Transportation Rail and Transit Division (MassDOT or Owner) is seeking Contractors to submit a sealed Bid for the following East Deerfield Yard Intermodal Improvements Project:

- Pre-Construction Survey and As-Built Plans
- Excavating and Wasting Excavated Material
- Removal/Demolition of Existing Track
- Furnish and install new track subballast, dense grade, and ballast
- Construction of new yard tracks, and line, surface and tamp track and turnouts
- Installation of New No. 10 Turnouts and New No.8 Turnouts
- Rehabilitation of existing No.10 Turnouts
- Rehabilitation of four (4) existing Receiving Tracks
- Furnish and install new sliding block derails
- Furnish and install new hinged block derails
- Furnish and install new Wheel Stops
- Furnish and install Rubber Rail Seal crossings
- Furnish and install HMA pavement for railroad yard crossings and approach to crossings
- Furnish and install Ballast for railroad yard crossings
- Furnish and install stone borrow for access roads
- Disposal and/or salvage of removed track material; plates, OTM, & Rail
- Removal and disposal of removed crossties
- Removal and disposal of trash and debris
- Cleanup of the work area
- All other work associated with the East Deerfield Yard Intermodal Improvements Project as described in the Contract Documents and as shown on the Contract Plans.

Bidders must be prequalified by the MBTA in Class 1 – General Transit Construction **and** in Class 3 – Trackwork to bid on the above project. An award will not be made to a Contractor who is not pre-qualified by the MBTA prior to the opening of Proposals.

Bids will be considered, and the contract awarded in accordance with statutes governing such contracts under Massachusetts General Laws Chapter 30 § 39M.

All bids shall be accompanied by a bid deposit in the amount of 5% of the value of the bid.

This Project is being funded, in part, by a Federal Highway Administration, National Highway Freight Program (“NHFP”) grant. The FHWA has transferred the grant funds to the Federal Rail Administration (“FRA”) for administration.

This project is subject to the schedule of prevailing wage rates as determined by the Commonwealth of Massachusetts Executive Office of Labor and Workforce Development, the Division of Occupational Safety, and the United States Department of Labor.

The Massachusetts Department of Transportation, in accordance with Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby affirmatively ensures that for any contract entered into pursuant to this advertisement, all bidders, including disadvantaged business enterprises, will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin in consideration for an Award.

This Proposal contains the "STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)". The goals and timetables applicable to this proposal for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all work, are contained in Appendices A and B-80 of the above specifications.

The Contractor (hereinafter includes consultants) will comply with the Acts and Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, as they may be amended from time to time, which are herein incorporated by reference and made a part of this Contract as contained in Appendices C and D of the above specifications.

This project has a DBE participation goal of **16%** for the work performed under this Contract.

All Contractors and Subcontractors working on the Pan Am Southern, LLC (“Railroad”) Right-of-Way (“RoW”) must have an approved Drug and Alcohol testing plan in compliance with all statutes and regulations administered by the Federal Railroad Administration (“FRA”) in implementing the required 49 CFR Part 219 Drug and Alcohol Program. Contractors are required to submit their approved Drug and Alcohol Testing Program along with their bids.

Bidders must also insert where indicated in the bid form a list of at least three (3) rail projects that the bidder performed in the field (rather than managed) and completed within the last five (5) years, each with a project value of at least \$5,000,000 and each with the following scope of work: complete track construction including jointed rail and turnout installation on active rail or adjacent to live rail. In addition, bidder is required to insert where indicated in the bid form the names of the skilled labor and supervisors that will work on this project. Any subcontractors used on this project are to be submitted to MassDOT for approval.

A mandatory Pre-Bid Meeting will be on **Tuesday, December 3, 2024 at 9:00 AM at 236 Greenfield Road, South Deerfield, MA.**

A mandatory site inspection will be scheduled and conducted starting immediately following the pre-bid meeting.

Attendance at the pre-bid meeting and site inspection is mandatory for all prospective bidders. All attendees accessing Railroad RoW must have the proper Personal Protection Equipment (PPE) required by the Railroad, including reflective vest, hardhat, safety glasses and safety toed boots.

Contractor questions concerning the Bid Package are due by 4:00 PM Friday, December 13, 2024. Contractor questions must be submitted through Contractor portal on COMMBUYS www.commbuys.com for this project. MassDOT and Owner's consultants will provide answers to questions by 4:00 PM Wednesday, December 18, 2024.

The apparent successful bidder will receive notification of their status on Monday, December 30, 2024 and pending approval by Owner, Contract Award / Notice to Proceed (NTP) would be anticipated by Tuesday, January 27, 2025.

The East Deerfield Yard Intermodal Project must be substantially completed by **Monday, December 1, 2025**, and all work must be completed by **Thursday, April 30, 2026**.

Please note that Contract work includes work on an active freight rail corridor. Train Operations are dictated by MassDOT and Pan Am Southern, LLC ("Railroad"). Contractor work hours and Railroad coordination provisions are set forth in the Contract Documents and Special Provisions.

Please note the production and equipment requirements specified in the Special Provisions as these have a direct effect on meeting the project schedule.

MassDOT projects are subject to the rules and regulations of the Architectural Access Board (521 CMR 1.00 et seq.)

Bid Documents, Contract Documents and Special Provisions, and Contract Plans will be available on the COMMBUYS website www.commbuys.com on **Thursday, November 21, 2024**

BY: Monica G. Tibbits-Nutt, Secretary and CEO, MassDOT
Meredith Slesinger, Administrator, MassDOT Rail and Transit Division
[SATURDAY, NOVEMBER 9, 2024]

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DOCUMENT 00210

REQUIREMENTS OF MASSACHUSETTS GENERAL LAWS
CHAPTER 30, SECTION 39R;
CHAPTER 30, SECTION 39O

July 1, 1981, updated October 2016

M.G.L. c. 30, § 39R. Award of Contracts; Accounting Statements; Annual Financial Statements; Definitions.

(a) The words defined herein shall have the meaning stated below whenever they appear in this section:

- (1) "Contractor" means any person, corporation, partnership, joint venture, sole proprietorship, or other entity awarded a contract pursuant to sections thirty-eight A1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A to forty-four H, inclusive, of chapter one hundred and forty-nine, which is for an amount or estimated amount greater than one hundred thousand dollars.
- (2) "Contract" means any contract awarded or executed pursuant to sections thirty-eight A1/2 to thirty-eight O, inclusive, of chapter seven and any contract awarded or executed pursuant to section eleven C of chapter twenty-five A, section thirty-nine M of chapter thirty, or sections forty-four A through forty-four H, inclusive, of chapter one hundred and forty-nine, which is for amount or estimated amount greater than one hundred thousand dollars.
- (3) "Records" means books of original entry, accounts, checks, bank statements and all other banking documents, correspondence, memoranda, invoices, computer printouts, tapes, discs, papers and other documents or transcribed information of any type, whether expressed in ordinary or machine language.
- (4) "Independent Certified Public Accountant" means a person duly registered in good standing and entitled to practice as a certified public accountant under the laws of the place of his residence or principal office and who is in fact independent. In determining whether an accountant is independent with respect to a particular person, appropriate consideration should be given to all relationships between the accountant and that person or any affiliate thereof. Determination of an accountant's independence shall not be confined to the relationships existing in connection with the filing of reports with the awarding authority.
- (5) "Audit", when used in regard to financial statements, means an examination of records by an independent certified public accountant in accordance with generally accepted accounting principles and auditing standards for the purpose of expressing a certified opinion thereon, or, in the alternative, a qualified opinion or a declination to express an opinion for stated reasons.
- (6) "Accountant's Report", when used in regard to financial statements, means a document in which an independent certified public accountant indicates the scope of the audit which he has made and sets forth his opinion regarding the financial statements taken as a whole with a listing of noted exceptions and qualifications, or an assertion to the effect that an overall opinion cannot be expressed. When an overall opinion cannot be expressed the reason therefor shall be stated. An accountant's report shall include as a part thereof a signed statement by the responsible corporate

officer attesting that management has fully disclosed all material facts to the independent certified public accountant, and that the audited financial statement is a true and complete statement of the financial condition of the contractor.

- (7) "Management", when used herein, means the chief executive officers, partners, principals or other person or persons primarily responsible for the financial and operational policies and practices of the contractor.
 - (8) Accounting terms, unless otherwise defined herein, shall have a meaning in accordance with generally accepted accounting principles and auditing standards.
- (b) Subsection (a)(2) hereof notwithstanding, every agreement or contract awarded or executed pursuant to sections thirty-eight A 1/2 to thirty-eight O, inclusive, of chapter seven, or eleven C of chapter twenty-five A, and pursuant to section thirty-nine M of chapter thirty or to section forty-four A through H, inclusive, of chapter one hundred and forty-nine, shall provide that:
- (1) The contractor shall make, and keep for at least six years after final payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of the contractor, and
 - (2) Until the expiration of six years after final payment, the office of inspector general, and the commissioner of capital asset management and maintenance shall have the right to examine any books, documents, papers or records of the contractor or of his subcontractors that directly pertain to, and involve transactions relating to, the contractor or his subcontractors, and
 - (3) If the agreement is a contract as defined herein, the contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with the awarding authority, including in his description the date of the change and reasons therefor, and shall accompany said description with a letter from the contractor's independent certified public accountant approving or otherwise commenting on the changes, and
 - (4) If the agreement is a contract as defined herein, the contractor has filed a statement of management on internal accounting controls as set forth in paragraph (c) below prior to the execution of the contract, and
 - (5) If the agreement is a contract as defined herein, the contractor has filed prior to the execution of the contracts and will continue to file annually, an audited financial statement for the most recent completed fiscal year as set forth in paragraph (d) below.
- (c) Every contractor awarded a contract shall file with the awarding authority a statement of management as to whether the system of internal accounting controls of the contractor and its subsidiaries reasonably assures that:
- (1) transactions are executed in accordance with management's general and specific authorization;
 - (2) transactions are recorded as necessary
 - i. to permit preparation of financial statements in conformity with generally accepted accounting principles, and

ii. to maintain accountability for assets;

- (3) access to assets is permitted only in accordance with management's general or specific authorization; and
- (4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.

Every contractor awarded a contract shall also file with the awarding authority a statement prepared and signed by an independent certified public accountant, stating that he has examined the statement of management on internal accounting controls, and expressing an opinion as to:

- (1) whether the representations of management in response to this paragraph and paragraph (b) above are consistent with the result of management's evaluation of the system of internal accounting controls; and
 - (2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to the applicant's financial statements.
- (d) Every contractor awarded a contract by the commonwealth or by any political subdivision thereof shall annually file with the commissioner of capital asset management and maintenance during the term of the contract a financial statement prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of final payment. All statements shall be accompanied by an accountant's report. Such statements shall be made available to the awarding authority upon request.
- (e) The office of inspector general, the commissioner of capital asset management and maintenance and any other awarding authority shall enforce the provisions of this section. The commissioner of capital asset management and maintenance may after providing an opportunity for the inspector general and other interested parties to comment, promulgate pursuant to the provisions of chapter thirty A such rules, regulations and guidelines as are necessary to effectuate the purposes of this section. Such rules, regulations and guidelines may be applicable to all awarding authorities. A contractor's failure to satisfy any of the requirements of this section may be grounds for debarment pursuant to section forty-four C of chapter one hundred and forty-nine.
- (f) Records and statements required to be made, kept or filed under the provisions of this section shall not be public records as defined in section seven of chapter four and shall not be open to public inspection; provided, however, that such records and statements shall be made available pursuant to the provisions of clause (2) of paragraph (b).

M.G.L. c. 30, § 39O: Suspension, Delay, or Interruption or Failure to Act by Awarding Authority; Adjustment in Contract Price; Submission of Claims.

Section 39O. Every contract subject to the provisions of section thirty-nine M of this chapter or subject to section forty-four A of chapter one hundred forty-nine shall contain the following provisions (a) and (b) in their entirety and, in the event a suspension, delay, interruption or failure to act of the awarding authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the general contractor for payment for an increase in the cost of his performance as provisions (a) and (b) give the general contractor against the awarding authority, but nothing in provisions (a) and (b) shall in any

way change, modify or alter any other rights which the general contractor or the subcontractor may have against each other.

- (a) The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.
- (b) The general contractor must submit the amount of a claim under provision (a) to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act or failure to act involved in the claim.

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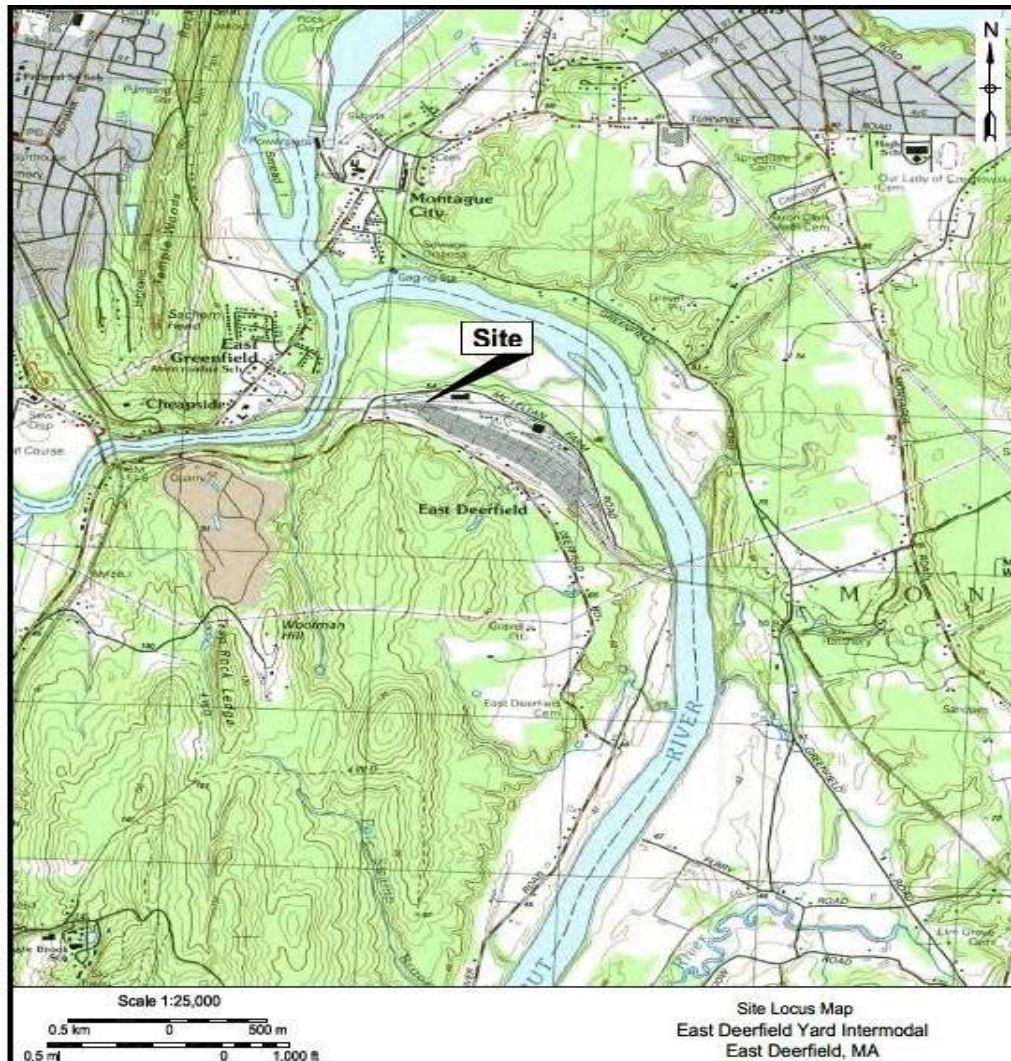
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DOCUMENT 00331

LOCUS MAP

EAST DEERFIELD

SITE: 33 RAILROAD YARD ROAD, EAST DEERFIELD, MA



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Proposal No. 613915-128373

DOCUMENT 00439

CONTRACTOR PROJECT EVALUATION FORM

CONTRACTOR PROJECT PERFORMANCE EVALUATION FORM

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT)									
CONTRACTOR PROJECT PERFORMANCE EVALUATION RECORD									
DATE:		MM/DD/YYYY		INTERIM REPORT NO.: (PROJECT MANAGER ASSIGNS)					
MASSDOT CONTRACT#:				FINAL REPORT NO.: (PROJECT MANAGER ASSIGNS)					
PROJECT NAME:									
RAIL & TRANSIT PROJECT MANAGER:				GENERAL ENGINEERING CONSULTANT					
				(IF APPLICABLE):					
GENERAL CONTRACTOR:				GENERAL CONTRACTOR					
				PROJECT MANAGER:					
CONTRACT AWARD AMOUNT:				CONTRACT AMENDMENT					
\$ -				ADJUSTED VALUE AMOUNT: \$ -					
PERCENT OF PROJECT COMPLETE				WORK PERFORMED BY PRIME CONTRACTOR - PERCENTAGE OF PROJECT					
TO DATE: %				SCHEDULE COMPLETED - MUST BE MINIMUM OF 50% %					
Partial Instructions (See Contractor Performance Evaluation Reports SOP for full instruction)									
1	The Project Manager (PM) and/or Assistant Project Manager (APM) will review criteria listed for each subcategory on the Ratings Tab (Green Tab) of this workbook. The PM or APM will use the attached guidelines in determining the rating for each subcategory. These guidelines provide overall guidance for ratings of 10, 8 and 4 specific to each category. Other whole number ratings may also be used if the description of the performance falls between the upper and lower ratings (10 and 4).								
2	The PM or APM will select the most appropriate whole number grade from drop down for each subcategory in the Green Shaded Box at the right side of the table. If subcategory is not applicable at this time, select "0" and note N/A in comments. Ratings will be automatically adjusted on the summary tab.								
3	When all of the lines for the subcategory have been completed, the overall average for that category will automatically calculate and be shown in the Yellow Shaded Box at the bottom of that category.								
4	Explanations must be entered in the green comments box on the Ratings Tab or below in the Project Managers Explanation section of the Form. If any subcategory entry is 10, or if the average for any subcategory is below 8. Please include specific examples.								
5	The PM will provide the evaluation to the Deputy Administrator for Rail for review and concurrence. If the Deputy Administrator disagrees with any portion of the evaluation, the Deputy Administrator will outline their rationale and recommended changes to the PM. Further discussions will be held between the PM, APM, Deputy Administrator, Other staff and consultants (e.g., General Consulting Engineers), if appropriate. The PM or APM shall document this meeting.								
6	If the group cannot reach agreement, the Deputy Administrator for Rail shall bring the matter to the attention of the attention of the Rail & Transit Administrator.								
7	If the General Contractor ratings are modified, the original rating and notes shall be preserved.								
8	Once review is finalized, PM forwards to General Contractor for receipt and acknowledgement.								
9	General Contractor is allowed 10 days to review. If not returned, process continues. Lack of response is noted in General Contractor Signature section DOES NOT change the rating or prevent the rating from being recorded by the MassDOT Rail & Transit Division for use as an evaluation tool in future construction procurements.								
10	General Contractor may request a meeting with the PM and the Deputy Administrator for Rail to discuss the ratings.								
		Excellent	Average	Poor	% Rating	% Rating without C	% Rating without E	% Rating w/out C & E	Weighted average (from scoring sheet)
		10	8	4		without C	without E	w/out C & E	
A.	Safety				x 2.0=	x 2.0=	x 2.0=	x 2.5=	#DIV/0!
B.	Overall Quality and Workmanship				x 2.0=	x 2.5	x 2.0=	x 2.5=	#DIV/0!
C.	Resolution of Construction Deficiencies				x 1.0=	0	x 1.0=	0	#DIV/0!
D.	Project Management				x 1.0=	x 1.5	x 1.5=	x 1.5=	#DIV/0!
E.	Change Orders				x 1.0=	x 1.0=	x 1.0=	x 1.0=	#DIV/0!
F.	Home Office Support				x 0.5=	x 0.5=	x 0.5=	x 0.5=	#DIV/0!
G.	Equipment				x 0.5=	x 0.5=	x 0.5=	x 0.5=	#DIV/0!
H.	On-Site Supervisory Personnel Rating				x 1.0=	x 0.5=	x 0.5=	x 0.5=	#DIV/0!
I.	General Compliance with Contract Requirements				x 1.0=	x 0.5=	x 1.0=	x 1.0=	#DIV/0!
					Overall Rating w/o Subs (Maximum Score = 100)				#DIV/0!
J.	Subcontractor Performance & Mgmt:				x 1.0=	x 1.0=	0	0	#DIV/0!
					Add'l Rating w/Subs Only (Included if applicable by PM)				#DIV/0!

CONTRACTOR PROJECT PERFORMANCE EVALUATION FORM[illegible]

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DOCUMENT 00710
GENERAL CONTRACT PROVISIONS

FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL
PROJECT

1. ARTICLE 1 - DEFINITIONS:

Wherever used in the Contract Documents the following terms, or pronouns in place of them, are used, the intent and meaning, unless a different intent or meaning is clearly indicated, shall be interpreted as set forth below.

The titles and headings of the Sections, Subsections and Articles herein are intended for convenience of reference and shall not be considered as having bearing on their interpretation.

Terms not defined below shall have their ordinary accepted meanings within the context which they are used. "Webster's Third New International Dictionary of the English Language, Edition 3, Unabridged, Copyright 2002", or subsequent revision thereof, shall provide ordinarily accepted meanings. Words which have a well-known technical or trade meaning when used to describe Work, materials or equipment shall be interpreted in accordance with such meaning.

Addenda: All clarifications, corrections, or changes issued graphically or in writing by Owner after the Notice to Bidders but prior to the opening of Bids.

Application for Payment: The form provided by Owner which is used by Contractor in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Approved or Approval: Means written approval by Owner or Owner's Authorized Representative.

Award: The acceptance by Owner of the successful Bid.

Bid: The proposal or offer of a Bidder, on the prescribed form(s) to perform the Work in accordance with the Contract Documents at the prices quoted.

Bidder: Any individual, firm, corporation or any acceptable combination thereof, or joint venture submitting a Bid for the Work.

Bid Documents: Specifications and Plans provided to prospective bidders for their use in developing their bid on the Project. Specifications documents include Notice to Bidders, Bid Form, Change Order Form, Special Provisions, General Contract Provisions, Schedule of Prevailing Wage Rates, Track Chart, Roadway Worker Protection Manual and On-Track Safety Program of the Railroad, Pan Am Manual for Track Maintenance and Construction, MassDOT MW-1, Environmental Permits, Plans and other supporting documents included with the Project.

ARTICLE 1 – DEFINITIONS (continued)

Calendar Day: Every day shown on the calendar, beginning and ending at midnight.

Change Order: A written order by Owner or its Authorized Representative directing changes to the Contract within its general scope.

Conditions of the Contract: Those portions of the Contract Documents which define the rights and responsibilities of the contracting parties and of others involved in the Work. The Conditions of the Contract include General Contract Provisions, Special Provisions and any other Conditions specified in the Notice to Bidders, and any Addenda thereto.

Consultant: A person, firm, agency or corporation retained by Owner or Railroad to prepare **Contract Documents**, perform construction administration services, inspect the Work, or perform other Project related services. A Consultant (including but not limited to engineers, architects, testing laboratories, and surveyors) may also be retained by Contractor or Bidder for services necessary for the completion of the Work.

Contract: The written and duly executed agreement between Owner and Contractor setting forth the obligations of the parties, including the Work and the basis of payment, as authorized by Owner. The Contract includes the Contract Documents and represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral.

Contract Amount: The total amount set forth in the executed Contract between Owner and Contractor, based on the successful bid for the Project, as adjusted by any Change Order or Contract amendments.

Contract Documents: The Contract form, Addenda thereto, the Bid Documents (including the Specifications and Plans), Contractor's Bid (including all appropriate bid tender forms), and all other Contract documents and other supporting documentation furnished by Owner to Contractor, together with all Change Orders and documents approved by Owner for inclusion, modifications and supplements issued on or after the Effective Date of the Contract. The Specifications include Notice to Bidders, Bid Form, Change Order Form, Special Provisions, General Contract Provisions, Schedules of Prevailing Wage Rates, Track Chart, Roadway Worker Protection Manual and On-Track Safety Program of Railroad, Pan Am Manual for Track Maintenance and Construction, MassDOT Mw-1, Environmental Permits, and Plans.

Contractor: The individual, firm, partnership, corporation, or combination thereof, private, municipal or public, including joint ventures, which, as an independent contractor, has entered into a Contract with Owner (as defined herein) to perform the Work, and who is referred to throughout the Contract Documents by singular number.

Contract Schedule or Project Schedule: The Project schedule or construction schedule for the Project prepared by Contractor in conformance with the provisions of the Contract Documents and submitted to Owner for approval.

Contract Time: The number of Calendar Days or the date specified in the Contract or Contract Schedule and authorized time extensions which identify how much time Contractor is allowed to achieve Final Completion.

ARTICLE 1 – DEFINITIONS (continued)

Cost of the Work: The sum of all costs actually incurred and necessary to carry out the Work and **paid** by Contractor in the proper performance of the Work.

Defective: An adjective which refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to Owner's approval of final payment.

Directive: A written communication to Contractor from Owner or Owner's Authorized Representative(s) interpreting or enforcing a Contract requirement or ordering commencement and/or cessation of an item of Work.

Drawings or Plans: The drawings which show the character and scope of the Work to be performed and which have been furnished by Owner and are made a part of the Contract Documents.

Effective Date of the Contract: The date on which the Contract is fully executed by both Contractor and Owner.

Final Completion: The Work (or specified part thereof) progressed to the point that all Work is complete, including final acceptance/commissioning, as determined by Owner.

Final Contract Amount: The total amount upon Final Completion of the Project based on Contractor's Bid, as adjusted by any Change Order or Contract amendments.

General Requirements: Sections of the Contract Documents which contain administrative and **procedural** requirements as well as requirements for temporary facilities.

Holidays: Owner recognizes the following Holidays:

- New Year's Day - January 1
- Martin Luther King Day – Third Monday in January
- Presidents Day – Third Monday in February
- Patriot's Day – Third Monday in April
- Memorial Day - Last Monday in May
- Independence Day - July 4
- Labor Day - First Monday in September
- Columbus Day – Second Monday in October
- Veterans Day – November 11
- Thanksgiving Day - Fourth Thursday in November
- Christmas Day - December 25

If any holiday listed above falls on a Saturday, Saturday and the preceding Friday are both **considered** as holidays. If the holiday should fall on a Sunday, Sunday and the following Monday are both considered as holidays.

Initial Contract Amount: The total amount set forth in the executed Contract between Owner and Contractor, based on the successful bid for the Project.

ARTICLE 1 – DEFINITIONS (continued)

Install: Means to build into the Work, ready to be used in complete and operable condition and in compliance with the Contract Documents.

Legal Requirements: All laws, rules, regulations, ordinances, codes and/or orders applicable to the Contract Work, including the Work's impact upon Railroad's operations.

Lump Sum Work: Work to be paid for on the basis of a single lump sum price bid for a specific item of work.

Notice of Award: The written notice by Owner to all Bidders identifying the successful Bidder and establishing Owner's intent to execute the Contract when all conditions required for execution of the Contract are met.

Notice to Bidders, Request for Bid or Invitations for Bids: The announcement inviting Bids for Work to be performed and/or materials to be furnished.

Notice to Proceed: A written notice by Owner to Contractor to begin the Work and establishing the date on which the Contract Time begins in accordance with the Contract Documents.

Owner: The Massachusetts Department of Transportation ("MassDOT"). Owner shall have the power to exercise the rights, responsibilities, authorities and functions vested in Owner, by virtue of Owner's ownership of the railroad property on which the Work shall be performed, and by virtue of certain contracts between Owner and Railroad, including, without limitation, the Owner / Railroad Agreements.

Owner Contract Manager: The person authorized to administer the Contract on behalf of Owner, who has authority to make findings, determinations and decisions with respect to the Contract and, when necessary, to modify or terminate the Contract. The Owner Contract Manager for this Contract shall be Scott Conti, Project Manager for MassDOT or, in his absence, James L. Eng, Deputy Rail Administrator for MassDOT.

Owner / Railroad Agreements: Written contracts between Owner and Railroad, including, without limitation, all License and Operating Agreements and amendments, and other contracts duly executed by Owner and Railroad which pertain to the Contract Work, or the safety, regulatory compliance and operation of the railroad right-of-way, track and related facilities where the Work will take place. The Owner / Railroad Agreements may change from time to time during the term of the Contract, and Owner shall notify Contractor in writing of such changes.

Owner's Authorized Representative(s): Person(s) designated in writing by Owner as authorized to oversee the construction of the Project in the field and to represent the interests of Owner, subject to the written determinations and authority of Owner.

Project: The total construction, of which the Work performed under the Contract Documents, is the whole or a part.

ARTICLE 1 – DEFINITIONS (continued)

Railroad: The railroad which is responsible for the safety and regulatory compliance of Owner's railroad right-of-way, track and related facilities where the Work will take place. As of April 2018, the Railroad is Pan Am Southern, LLC (Also known as "Pan Am Railroad" or "Pan Am Southern"). Owner shall notify Contractor in writing upon any change to the identity or description of Railroad during the term of the Contract. The term "Railroad", when used in the text of these General Contract Provisions or other Contract Documents, shall also mean any duly authorized representative of Railroad when authorized in accordance with these General Contract Provisions.

Railroad's Authorized Representative(s): Person(s) designated in writing by Railroad as authorized representative(s), who are authorized to make findings, determinations and decisions on behalf of Railroad.

Shop Drawings: All Drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier and submitted by Contractor to illustrate material, equipment, fabrication, or erection for some portion of the Work.

Special Provisions: Includes, but is not limited to, those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative and procedural details applicable thereto.

Subcontractor: An individual, firm, or corporation to whom Contractor sublets part of the Contract. However, Contractor remains responsible for the Work.

Substantial Completion: The Work shall be Substantially Complete when either (a) the Work required by the Contract has been completed, except for Work having a cost of less than onepercent (1%) of the then-adjusted total Contract Amount, or (b) substantially all of the Work has been completed and available for use except for minor incomplete or unsatisfactory Work items that do not materially impair the usefulness of the Work required by the Contract. The terms "Substantially Complete" and "Substantially Completed" as applied to any Work refer to Substantial Completion thereof.

Time and Material Work: Work to be paid for on the basis of actual labor expended and actual cost of furnishing and incorporating material into the Project.

Unit Price Work: Work to be paid for on the basis of unit prices bid for specific items of work.

Work: The act of, and the result of, performing services, furnishing labor, furnishing and incorporating materials and equipment into the Project, and performing other duties and obligations, all as required by, and in compliance with, the Contract Documents. Such Work, however incremental, will culminate in the entire completed Project, or the various separately identifiable parts thereof.

2. ARTICLE 2 – AUTHORITIES AND LIMITATIONS:

2.1 RAILROAD’S AUTHORITY AND LIMITATIONS:

- 2.1.1 Railroad is responsible for the safety and regulatory compliance of Owner’s railroad right-of-way, track and related facilities where the Work will take place, and shall have the authority to exercise its rights and obligations pursuant to the Owner / Railroad Agreements and applicable statutes, regulations and ordinances with respect to the Work.
- 2.1.2 Railroad (and Owner) shall have the right to review and approve the proposed Project Schedule.
- 2.1.3 All track outages shall require the prior approval of Railroad (and Owner).
- 2.1.4 Railroad shall have the right to enter upon the Work site, to inspect the Work and related materials and equipment for compliance with the Contract Documents and applicable safety requirements.
- 2.1.5 Railroad will provide flagpersons and Engineers-In-Charge (EICs) as required for the performance of the Work.

2.2 EVALUATION BY OWNER

- 2.2.1 Owner will decide all questions which may arise as to:
- 2.2.2 Quality and acceptability of materials furnished;
- 2.2.3 Quality and acceptability of Work performed;
- 2.2.4 Compliance with the Project Schedule;
- 2.2.5 Interpretation of Contract Documents; and
- 2.2.6 Acceptable fulfillment of the Contract on the part of Contractor.

2.3 MEANS & METHODS

- 2.3.1 The means, methods, techniques, sequences or procedures of construction, or safety precautions and the program incident thereto, and the failure to perform or furnish the Work in accordance with the Contract Documents are the sole responsibility of Contractor.

2.4 SITE VISITS AND INSPECTIONS

- 2.4.1 Railroad and Owner and their representatives may make visits to the site(s), any off- site fabrication sites and approved remote storage sites at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents.
- 2.4.2 Such observations or the lack of such observations shall in no way relieve Contractor from its duty to perform the Work in accordance with the Contract Documents.

2.5 OWNER’S AUTHORITY AND LIMITATIONS

- 2.5.1 Owner alone shall have the power to exercise the rights, responsibilities, authorities and functions vested in Owner, by virtue of Owner’s ownership of the railroad property, including the real property and improvements thereon, and by virtue of the Owner / Railroad Agreements.
- 2.5.2 Owner and its representatives shall have the right to enter upon the Work site, to inspect the Work and related materials and equipment for compliance with the Contract Documents and Owner’s requirements, and to otherwise exercise Owner’s rights with respect to the railroad property, improvements thereto, the Owner / Railroad Agreements, and the Project.

ARTICLE 2 – AUTHORITIES AND LIMITATIONS (continued)

- 2.5.3 Contractor shall perform the Work in accordance with any written order (including but not limited to instruction, directive, interpretation or determination) issued by Owner or Owner's Authorized Representative(s).
- 2.5.4 Contractor assumes all the risk and consequences of performing the Work in accordance with any order (including but not limited to instruction, direction, interpretation or determination) of anyone not authorized to issue such order, and of any order not in writing.
- 2.5.5 Owner's rights hereunder shall survive the termination or expiration of the Contract.

3. ARTICLE 3 – CONTRACT DOCUMENTS - INTENT, AMENDING:**3.1 INCOMPLETE CONTRACT DOCUMENTS**

- 3.1.1 The execution of the Contract by Contractor is considered a representation that Contractor has examined the Contract Documents to make certain that all sheets and pages of plans and specifications were provided and that Contractor is satisfied as to the conditions to be encountered in performing the Work.
- 3.1.2 Owner expressly denies any responsibility or liability for a Bid submitted on the basis of an incomplete set of Contract Documents.

3.2 COPIES OF CONTRACT DOCUMENTS

- 3.2.1 Owner shall furnish to Contractor up to two copies of the Contract Documents.

3.3 SCOPE OF WORK

- 3.3.1 The Contract Documents comprise the entire Contract between Owner and Contractor concerning the Work.
- 3.3.2 The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the current practices regarding the Work of the Project. If a conflict or question arises within the Contract Documents, the Program Manager's interpretation will govern.

3.4 INTENT OF CONTRACT DOCUMENTS

- 3.4.1 It is the intent of the Contract Documents to describe a functionally complete Project to be constructed in accordance with the Contract Documents.
- 3.4.2 Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied, without any adjustment in Contract Amount or Contract Time, whether or not specifically called for.
- 3.4.3 Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the requirements of any governmental authority, whether such reference be specific or by implication, shall mean the edition stated in the Contract Documents or, if not stated, the latest standard specification, manual, code or requirements in effect at the time of advertisement for the Project (or, on the Effective Date of the Contract if there was no advertisement).

ARTICLE 3 – CONTRACT DOCUMENTS – INTENT, AMENDING (continued)

- 3.4.4 However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be deemed to change the duties and responsibilities of Contractor, or any of its subcontractors, agents or employees from those set forth in the Contract Documents, nor shall it be deemed to assign to Owner, Railroad, or any of Owner's or Railroad's Consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Sections 2.1 through 2.5.
- 3.4.5 Unless otherwise specified in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Any question or conflict in regard to interpretation will be resolved by Owner or Owner's Authorized Representatives.

3.5 DISCREPANCY IN CONTRACT DOCUMENTS

- 3.5.1 Before undertaking the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures, and dimensions shown thereon and all applicable field measurements.
- 3.5.2 Work performed in an area by Contractor shall imply verification of figures, dimensions and field measurements for that particular area of Work.
- 3.5.3 If, during the above study or during the performance of the Work, Contractor finds a conflict, error, discrepancy or omission in the Contract Document, or a discrepancy between the Contract Documents and any standard specification, manual, code, regulatory requirement or other Legal Requirement which affects the Work, Contractor shall promptly report such discrepancy in writing to Owner.
- 3.5.4 Contractor shall obtain a written interpretation or clarification from Owner before proceeding with any Work affected thereby.
- 3.5.5 However, Contractor shall not be liable to Owner for failure to report any conflict, error or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof or should reasonably have known thereof.

3.6 DISCREPANCY – ORDER OF PRECEDENCE

- 3.6.1 When conflicts, errors, or discrepancies within the Contract Documents exist, the order of precedence will be as follows:
- 3.6.1.1 Contract Amendments
 - 3.6.1.2 Contract (in the following order):
 - 3.6.1.3 Addenda including bid questions and responses
 - 3.6.1.4 Special Provisions, Detail Sheets and Permits
 - 3.6.1.5 Plans
 - 3.6.1.6 General Contract Provisions
- 3.6.2 Contractor shall not take advantage of any apparent error or omission in the Contract Documents. If Contractor discovers an error or omission, the Contractor shall immediately notify the Owner. Owner will make corrections and interpretation as necessary to fulfill the intent of the Contract.

ARTICLE 3 – CONTRACT DOCUMENTS – INTENT, AMENDING (continued)

3.7 CLARIFICATIONS AND INTERPRETATIONS

- 3.7.1 Owner, directly or through its Authorized Representative(s), will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents to Contractor as Owner may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.
- 3.7.2 Owner, directly or through its Authorized Representative(s), will make a decision on interpretation of the specifications, approval of equipment, material or any other approval, or progress of the work, promptly and, in any event, no later than thirty (30) days after the written submission for the decision; but if such decision requires extended investigation and study, Owner or its Authorized Representative(s) shall, within thirty (30) days after receipt of the submission, give the party making the submission written notice of the reasons why the decision cannot be made within the thirty (30) day period and the date by which the decision will be made.

4. ARTICLE 4 – LANDS AND PHYSICAL CONDITIONS:**4.1 VISIT TO SITE**

- 4.1.1 The execution of the Contract by Contractor is considered a representation that Contractor has visited and carefully examined the site and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the Contract Documents.

4.2 UTILITIES

- 4.2.1 Contractor shall have full responsibility for:
- 4.2.1.1 Reviewing and checking all information and data concerning utilities.
 - 4.2.1.2 Contacting DigSafe (811) at least 72 hours, exclusive of Saturdays, Sundays or holidays, but not more than thirty (30) days prior to the commencement of any excavation or removal of earth activities within private ways or public property, to have utilities locate and mark any underground facility within the proposed work area.
 - 4.2.1.3 Locating all underground utilities shown or indicated in the Contract Documents which are affected by the Work.
 - 4.2.1.4 Coordination of the Work with the owners of all utilities during construction.
 - 4.2.1.5 Safety and protection of all utilities.
 - 4.2.1.6 Repair of any damage to utilities resulting from the Work.

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5. ARTICLE 5 – INSURANCE:**5.1 INSURANCE REQUIREMENTS**

- 5.1.1 In addition to any other forms of insurance or bonds required under the Contract, and except to the extent that any of the requirements of this Article are expressly waived in writing by Owner, Contractor shall, at its sole cost and expense, obtain, carry and maintain throughout the life of this Contract, insurance not less than the amounts and coverage herein specified, and Owner, Railroad and others identified herein shall be named as an additional named insureds under the insurance coverage so specified, with respect to the performance of the Work. Provided, however, that Owner need not be an additional insured on the Railroad Protective Liability insurance policy referenced herein.
- 5.1.2 There shall be no right of subrogation against Owner, Railroad or their agents performing work in connection with the Work, and this waiver of subrogation shall be endorsed upon the policies
- 5.1.3 Insurance shall be placed with the companies licensed to do business in the Commonwealth of Massachusetts and these policies providing coverage there under shall contain provisions that no cancellation or material changes in the policy shall become effective except upon thirty (30) days prior written notice thereof to Owner, Railroad and any other additional or co-insureds.
- 5.1.4 Prior to commencement of the Work, Contractor shall furnish certificates to Owner, in duplicate, evidencing that the insurance policy provisions required hereunder are in force.
- 5.1.5 Acceptance by Owner of deficient evidence of insurance does not constitute a waiver of Contract insurance requirements.
- 5.1.6 Contractor shall furnish Owner with certified copies of policies upon request. The minimum coverages and limits required are as follows:
 - 5.1.6.1 Worker's Compensation insurance in accordance with the statutory coverages required by the Commonwealth of Massachusetts and Employers' Liability insurance with limits not less than One Million Dollars (\$1,000,000) for bodily injury by accident, each accident; One Million Dollars (\$1,000,000) for bodily injury by disease, policy limit; and One Million Dollars (\$1,000,000) for bodily injury by disease, each employee, and, where applicable, insurance in compliance with any other statutory obligations.
 - 5.1.6.2 Public Liability or Commercial General Liability insurance with limits not less than Two Million Dollars (\$2,000,000) per occurrence and Six Million Dollars (\$6,000,000) aggregate for Bodily Injury and Property Damage, including coverage for Premises and Operations Liability, Products and Completed Operations Liability, Contractual Liability, Broad Form Property Damage Liability and Personal Injury Liability. Coverage shall not contain any exclusions of Explosion, Collapse, or Underground conditions. An umbrella policy may be utilized to satisfy the required limits of liability under this section.
 - 5.1.6.3 Commercial Automobile Liability on all owned, non-owned, hired and rented vehicles used in connection with the work to be performed hereunder, with limits of liability of not less than Two Million Dollars (\$2,000,000) Combined Single Limit for Bodily Injury and Property Damage per each accident or loss.

ARTICLE 5 – INSURANCE (continued)

- 5.1.6.4 Railroad Protective Liability Insurance (ISO-RIMA FORM) with a limit of not less than Five Million Dollars (\$5,000,000) per occurrence, combined single limit for bodily injury and/or property damage, for all damages arising out of bodily injuries to or death of all persons and for damage to or destruction of property, including the loss of use thereof. Such insurance shall also contain an aggregate of not less than Ten Million Dollars (\$10,000,000) for damages arising out of more than one occurrence. Contractor shall also provide a certified copy of the Railroad Protective Liability Insurance policy to Railroad upon request.
- 5.1.6.5 If Work involves use of watercraft, Protection and Indemnity insurance with limits not less than \$5,000,000 per occurrence. Hull and Machinery coverage is to be carried on the vessel for the full current market value. This coverage requirement may be waived at the discretion of Owner if Contractor self-insures the equipment and will waive all rights of recovery against Owner and Railroad in writing.
- 5.1.6.6 Where applicable, Professional Liability insurance with limits of not less than \$1,000,000 per claim and \$2,000,000 aggregate, subject to a maximum deductible \$10,000 per claim.
- 5.1.6.7 All insurance policies as described above are required to be written on an “occurrence” basis. In the event occurrence coverage is not available, Contractor agrees to maintain “claims made” coverage for a minimum of two years after the date of Final Completion of the Project.
- 5.1.6.8 In the event of loss or damage to Owner’s real property or improvements thereto which is caused by the act or omission of Contractor or its agents, insurance payments shall be made to the Commonwealth of Massachusetts or MassDOT, at Owner’s election, and Owner shall also reimburse Railroad from the proceeds of such payments for appropriate, documented costs incurred by Railroad in repairing such damage.
- 5.1.6.9 The following parties shall be additional named insureds on all policies of insurance:
- The Massachusetts Bay Transportation Authority (“MBTA”); Pan Am Southern, LLC
- 5.1.6.10 Contractor must provide evidence of insurance as a condition of Award, and must maintain all insurance policies as set forth herein throughout the Contract. Failure to provide and maintain the insurance as required herein shall be a material breach of the Contract and shall operate to immediately cancel and terminate the Contract.

5.2 NOT USED

5.3 NOT USED

5.4 NOT USED

ARTICLE 5 – INSURANCE (continued)

5.5 INDEMNIFICATION

- 5.5.1 Contractor shall be responsible for and shall protect, indemnify, defend and hold harmless Owner and the officers, directors, employees, agents (including Consultants) and subsidiary agencies of Owner (including, without limitation, the Massachusetts Bay Transportation Authority (“MBTA”), Railroad (including Railroad’s parent companies, affiliates, and subsidiaries), and Pan Am Southern, LLC. (hereinafter “Indemnified Party or Parties”), from and against any and all claims, losses, damages, liability, costs, or actions (including but not limited to attorneys’ fees) which such Indemnified Party may suffer or which such Indemnified Party may be held liable for, by reason of injury (including death) to any person or persons, or damage to any property arising out of or resulting from, directly or indirectly, the acts or omissions of Contractor, excepting to the extent such losses, damages, liability, costs or actions are caused by the negligence of the Indemnified Party
- 5.5.2 Contractor shall indemnify, save harmless, and defend the Indemnified Parties and their respective agents, employees, officers, directors and representatives from any and all claims or actions for injuries or damages sustained by any person or property arising directly or indirectly from the Work or Contractor’s performance of this Contract; provided, however, that this provision has no effect if, but only if, the sole proximate cause of the injury or damage is the negligence of Railroad or its agents. Provided further, that Owner shall have no liability for Railroad’s negligent acts or failures to act.
- 5.5.3 Contractor shall assume all responsibility for any and all loss or damage arising out of the acts or omissions of Contractor, the officers, directors, agents, and employees of Contractor, and of all sub-contractors of Contractor, with respect to any act or omission not authorized by this Contract on the part of Contractor of any person or agent employed by it.
- 5.5.4 Contractor shall be responsible for and shall protect, indemnify, defend and hold harmless the Indemnified Parties from and against any and all claims, losses, damages, liability, costs, or actions (including but not limited to attorney’s fees) arising out of or resulting from, directly or indirectly, the performance of all or any part of the Contract; the use of any equipment, explosives, materials, or chemicals by Contractor hereunder; the performance of the Work of the Project; or claims or actions which may be attributable to any defect in the equipment used or arising from the material or any article used therein or from the design, testing, or use thereof or from any maintenance, storage, service, repair, overhaul, or testing of the equipment, materials, or chemicals used, regardless of when such defect shall be discovered, excepting to the extent such losses, damages, liability, costs or actions are caused by the negligence of the Indemnified Party.
- 5.5.5 Without limiting the generality of the foregoing, it is the clear intent of the Parties that the Indemnified Parties be indemnified and defended for any and all products liability, strict liability or strict products liability and/or the negligence of an Indemnified Party. Contractor shall protect, indemnify, defend and hold harmless such Indemnified Parties, excepting to the extent such losses, damages, liability, costs or actions are caused by the negligence of the Indemnified Party.
- 5.5.6 Furnishing of insurance by Contractor as required herein shall not limit Contractor’s liability hereunder, but shall be additional security therefore.

6. ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES:

6.1 SUPERVISION OF WORK

- 6.1.1 Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- 6.1.2 All Work under this Contract shall be performed in a skillful and workmanlike manner. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.
- 6.1.3 Contractor shall keep on the Work at all times during its progress a competent resident superintendent.
- 6.1.4 The superintendent will be Contractor’s representative at the site and shall have full authority to act and sign documents on behalf of Contractor.
- 6.1.5 All communications given to the superintendent shall be as binding as if given to Contractor.
- 6.1.6 Contractor shall cooperate with Owner and Railroad in every way possible.
- 6.1.7 All employees of Contractor and any Subcontractors working on railroad Right-of- Way shall be required to attend a 4-hour railroad Roadway Worker Protection course (RWP) at no cost to the Project. See Section 6.14.

6.2 CHARACTER OF WORKERS

- 6.2.1 Contractor shall provide a sufficient number of competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents.
- 6.2.2 Contractor shall at all times maintain good discipline and order at the site.
- 6.2.3 Owner may, in writing, require Contractor to remove from the Work any employee of Contractor or any Subcontractor whom Owner deems incompetent, careless, or otherwise detrimental to the progress of the Work, or who threatens the safety of the public or the safe operation of the railroad, but Owner shall have no duty to exercise this right.

6.3 CONTRACTOR TO FURNISH

- 6.3.1 Unless otherwise specified in the Contract Documents, Contractor shall furnish and assume full responsibility for all materials, equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.4 MATERIALS AND EQUIPMENT

- 6.4.1 All materials and equipment shall be of specified quality and new, except as otherwise provided in the Contract Documents. If required by Owner, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment.

6.5 ANTICIPATED SCHEDULES

- 6.5.1 The construction of this project shall be planned and recorded with a suitable Project Schedule methodology. The Project Schedule shall be used for coordination and monitoring of all Work under the Contract, including all activity of subcontractors, manufacturers, suppliers, utility companies, as well as review activities of Owner and Railroad.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES (continued)

- 6.5.2 A preliminary Project Schedule shall be submitted with the Bid Form as part of Contractor’s Bid. Within a reasonable time prior to the pre-construction conference, Contractor shall submit a detailed proposed Project Schedule to Owner and Railroad for review and approval. The proposed Project Schedule shall meet the requirements set forth below. The construction time for the entire Project shall not exceed the specified Contract Time. Following Owner’s and Railroad’s review, if revisions to the proposed Project Schedule are required, Contractor shall do so promptly. The Project Schedule must be finalized within fourteen (14) days of the Notice to Proceed, and prior to initiation of Work.
- 6.5.3 The Project Schedule shall be presented to Owner and Railroad and shall include a description of major project activities, the duration of each of the project activities, the resources required for each of the project activities, and the progress payment values assigned to the completed Work including:
 - 6.5.3.1 Labor, showing workdays per week, holidays, shifts per day, persons per shift, and hours per shift;
 - 6.5.3.2 Equipment, including the number of units of each type equipment.
 - 6.5.3.3 Materials to be furnished by Contractor
- 6.5.4 The Project Schedule shall provide a detailed breakdown of activities scheduled for the first fourteen (14) days of the project and summary of activities for Work beyond fourteen (14) days. Said Project Schedule shall include mobilization, submittals, procurement, and construction.
- 6.5.5 No Work may be initiated at the site without an approved Project Schedule or an approved Project Schedule.

6.6 ADJUSTING SCHEDULES

- 6.6.1 Job site progress meetings will be held weekly by Owner, Railroad and Contractor for the purpose of reviewing the progress of the Work, determining upcoming work activities, updating the Project Schedule, and resolving problems and issues related to the Work.
- 6.6.2 The Contract Time will be adjusted only for causes specified in this Contract.

6.7 NOT USED**6.8 NOT USED****6.9 SUBSTITUTE MEANS AND METHODS**

- 6.9.1 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, Contractor may furnish or utilize substitute means, method, sequence, technique or procedure of construction acceptable to Owner, if Contractor submits sufficient information to allow Owner to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents, and provided that Owner (directly or through its Authorized Representative(s)) accepts such substitute means and methods in writing.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES (continued)

6.10 CONTRACTOR DAILY REPORTING

6.10.1 Contractor shall prepare and submit a “Daily Activities Report” to Owner and Railroad within two (2) business days of each completed work shift. The Daily Activities Report shall include:

1. a summary of all activity on each job site;
2. a list of all manpower on site (by craft and job assignment) including Foremen and other supervisory staff on site;
3. a list of all equipment on each job site;
4. a list of all materials delivered to site and/or removed from site and used on site during the work period;
5. weather conditions (beginning of work shift and mid-shift); and
6. any other information Owner may require to have an accurate record of daily work activity.

6.11 USE OF PREMISES

6.11.1 Contractor shall confine locations of construction equipment, the storage of materials and equipment and the operations of workers to the Project limits and approved remote storage sites, lands and areas, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment.

6.11.2 Contractor shall be solely responsible for obtaining necessary and appropriate approvals to use any property beyond the Project limits (including any property owned by parties other than Owner) from the owner of such property, and shall be solely responsible for all costs and liabilities associated with Contractor’s use of such property.

6.11.3 Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work.

6.11.4 Should any claim be made against Owner or Railroad by any such owner or occupant because of the performance of the Work, Contractor shall defend, indemnify and hold Owner, Railroad, and their agents harmless therefrom.

6.12 RECORD DOCUMENTS

6.12.1 Contractor shall maintain in a safe place at the site one record copy of all Special Provisions, Addenda, field memos, work orders, Change Orders, supplemental agreements, and written interpretations and clarifications in good order and annotated to show all changes made during construction.

6.12.2 Upon completion of the Work, two (2) sets of the annotated record documents, samples and Shop Drawings shall be delivered to Owner.

6.12.3 Record documents shall accurately record elements of the Work which vary from requirements shown or described in the Contract Documents.

6.12.4 Contractor shall furnish, upon completion of the work and as a condition for receiving final payment, as-built plans for all Work, specifically “as-built” plans providing “as-built” information for all plans contained within the Contract Documents originally issued and/or updated by Owner.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES (continued)

- 6.12.5 One hard copy and one digital copy of each Record Document required by the Contract Documents, including those described by Subsection 6.12.4 and all warranties and guarantees required or otherwise associated with the Work shall be submitted to and accepted by Owner as a condition of final payment for Contractor’s work.
- 6.12.6 One hard copy and one digital copy of each Record Document required by the Contract Documents, and all warranties and guarantees required or otherwise associated with the Work shall be submitted to and accepted by Owner as a condition of final payment for Contractor’s work.

6.13 SAFETY AND PROTECTION

- 6.13.1 Contractor alone shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.
- 6.13.2 Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 6.13.2.1 All employees on the Work and other persons and organizations who may be affected thereby; All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
 - 6.13.2.2 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation or replacement in the course of construction.
- 6.13.3 In the performance of this Contract, Contractor shall comply with all applicable federal, state, and local laws governing safety, health, and sanitation. Contractor shall comply with all FRA and OSHA safety requirements. Contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as Owner or Railroad may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the Work covered by the Contract.
- 6.13.4 In accordance with the provisions of Massachusetts General Laws Chapter 30, Section 39S, all Contractor and Subcontractor Employees that are employed in the work shall have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least ten (10) hours in duration at the time the employee begins work. Contractor shall furnish documentation of said course with the first certifiable payroll report for each employee.
- 6.13.5 Contractor shall notify owners of adjacent property and any utilities when prosecution of the Work may affect them, and shall cooperate with such property owners and utilities in the protection, removal, relocation and replacement of their property, and shall obtain appropriate approvals from the owners of such adjacent property and/or utilities prior to performing any Work that may impact such property or utilities.
- 6.13.6 All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, any subcontractor, supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by Contractor with no change in Contract Amount or Contract Time except damage or loss attributable to unforeseeable causes beyond the control of and without the fault or negligence of Contractor, including but not restricted to acts of God, or governmental authorities.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES (continued)

- 6.13.7 Contractor’s duties and responsibilities for the safety and protection of the Work shall continue until Final Completion except as otherwise expressly provided in connection with Substantial Completion.
- 6.13.8 Contractor shall designate a responsible safety representative at the site. This person shall be Contractor's superintendent unless otherwise designated in writing by Contractor to Owner and Railroad.

6.14 WORKER SAFETY ON RAILROAD PROPERTY

- 6.14.1 The safety of personnel, property, rail operations, and the public is of paramount importance in the prosecution of the Work pursuant to this Contract. As reinforcement and in furtherance of overall safety measures to be observed by Contractor (and not by way of limitation), the following special safety rules shall be followed while performing any Work or undertaking any related activities on or near the railroad property. Further railroad safety information may be obtained in the Special Provisions.
- 6.14.2 Contractor shall submit their Safety Program with specific project requirements for review, comment and approval no later than seven (7) days prior to the start of work on MassDOT property.
- 6.14.3 In the event Contractor or its subcontractor will be performing construction or other activities on or in close proximity to a railroad track, Contractor shall be responsible for compliance with the Federal Railroad Administration’s Roadway Worker Protection (“RWP”) regulations (49 CFR 214, Subpart C). Under 49 CFR 214, Subpart C, railroad Contractors are responsible for the training of their employees with respect to these regulations. All RWP related Work shall be conducted in strict compliance with the RWP safety standards set forth in 49 CFR 214, Subpart C and Contractor will be required to have all of its personnel who will be on or in close proximity to a railroad track to attend all and any RWP safety classes conducted by Railroad for the benefit of Contractor’s employees at no cost to the Project.
- 6.14.4 In the event Contractor will be performing construction or other activities on a railroad bridge, the provisions of 49 CFR 214 Subpart B regarding Bridge Worker Safety shall apply. All bridge related Work shall be conducted in strict compliance with the Safety Standards set forth in 49 CFR 214.
- 6.14.5 Contractor shall arrange with Railroad to keep itself informed on the time of arrival of all trains and shall stop any of Contractor’s or Subcontractor’s operations which might be or cause a hazard to the safe passage of the train past the Work site from 10 minutes before the expected arrival of the train until it has passed or at any other time as directed by the flagman.
- 6.14.6 Railroad flag protection is required before any activity can occur on or near a railroad operating facility such as a track, yard, bridge or shop building. For incidental work, such as surveying or inspection, a Railroad qualified flagman will provide a safety briefing prior to the commencement of the Work to discuss how and when protection from train traffic is to be provided. For any activity involving a disturbance or potential disturbance to the track, track embankment, or any railroad facility, Railroad may require a specific Railroad Safety Plan prior to startup. Projects which involve activities which cross the tracks or are longitudinal to the tracks will require a specific Railroad Safety Plan and a training course administered by Railroad for Contractor’s project supervisors prior to the initiation of Work on railroad property.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES (continued)

- 6.14.7 Contractor shall arrange for Railroad flag protection when performing any Work within twenty (20) feet of any track. All Work within twenty (20) feet of the track shall cease when a train passes and all Contractor employees shall maintain a distance of at least twenty (20) feet from the track until the train has safely passed. In addition, any Work that could come within twenty (20) feet of the track will cease when a train passes. For example, crane or pile driving activities shall stop when trains pass when the maximum boom and suspended load radius can come within twenty (20) feet of the tracks. Pile driving shall not be done when trains are passing the Work site. Vehicles and other construction equipment shall not be operated or parked closer than twenty (20) feet from any track without Railroad flag protection.
- 6.14.8 Track outages require Owner’s and Railroad’s prior approval. Prior to a proposed track outage, Contractor shall submit a closure plan to Owner and Railroad for approval. The closure plan will describe the Work to be accomplished, the equipment, manpower and other resources required, and the schedule. Once approved by Owner and Railroad, Contractor shall follow the approved closure plan. Owner reserves the right, directly or through Railroad, to assume control of the Work to reestablish rail service if the schedule is not met. Contractor shall bear all costs and damages which may result from failure to meet the approved closure schedule
- 6.14.9 Whenever a Railroad flagperson/Employee-in-Charge (EIC) is required for performance of the Work, he or she will be provided by Railroad at no expense to Contractor. A minimum of 48 hours’ notice is required for the scheduling of Railroad flag protection. Requests for EIC are to be made to Railroad’s Roadmaster or Track Supervisor.

6.15 EMERGENCIES

- 6.15.1 In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury or loss, with or without special instruction or authorization from Owner or Railroad.
- 6.15.2 Contractor shall give Owner prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents is required because of the action taken in response to an emergency.

6.16 CONTINUING THE WORK

- 6.16.1 Contractor shall continue to carry out the Work and adhere to the Project Schedule during all disputes or disagreements with Owner or Railroad.
- 6.16.2 No Work shall be delayed or postponed pending resolution of any disputes, disagreements, or claims except as Contractor and Owner may otherwise agree in writing.

6.17 CONSENT TO ASSIGNMENT

- 6.17.1 Contractor shall obtain the prior written consent of Owner to any proposed assignment of any interest in, or part of this Contract.
- 6.17.2 The consent to any assignment or transfer shall not operate to relieve Contractor of any of his or its obligations under this Contract.
- 6.17.3 Nothing herein contained shall be construed to hinder, prevent, or affect an assignment of monies due, or to become due hereunder, made for the benefit of Contractor's creditors pursuant to law.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES (continued)

6.18 CONTRACTOR’S RECORDS

- 6.18.1 Records of Contractor and Subcontractor(s) relating to personnel, payrolls, invoices of materials, and any and all other data relevant to the performance of the Contract, must be kept on a generally recognized accounting system.
- 6.18.2 Such records must be available during normal work hours to Owner for purposes of investigation to ascertain compliance with provisions of the Contract Documents.
- 6.18.3 Payroll records must contain the name and address of each employee, his/her correct classification, social security number, rate of pay, daily and weekly number of hours of worked, deductions made, and actual wages paid and any other information required by the U.S. and/or State Department of Labor.
- 6.18.4 Contractor and Subcontractor(s) shall make employment records available for inspection by Owner and its representatives, and will permit such representatives to interview employees during working hours on the Project.
- 6.18.5 Records of all communications between Owner and Contractor, Railroad and Contractor and other parties, where such communications affected performance of this Contract, must be kept by Contractor and maintained for a period of three (3) years from Final Completion.
- 6.18.6 Owner and its assigned representatives may perform an audit of these records during normal work hours after written notice to Contractor.
- 6.18.7 In accordance with the provisions of M.G.L. Chapter 30, Section 39R, every agreement or Contract awarded where the Contract Amount is greater than One Hundred Thousand Dollars (\$100,000), shall provide that:
 - 6.18.7.1 Contractor shall make and keep for at least six (6) years after Final Payment, books, records, and accounts which in reasonable detail accurately and fairly reflect the transactions and dispositions of Contractor
 - 6.18.7.2 Until the expiration of six (6) years after Final payment, the Office of Inspector General, and the Commissioner of Capital Asset Management and Maintenance shall have the right to examine any books, documents, papers or records of Contractor or of its Subcontractors that directly pertain to, and involve transactions relating to, the Contractor or its Subcontractors.
 - 6.18.7.3 Contractor shall describe any change in the method of maintaining records or recording transactions which materially affect any statements filed with Railroad and Owner, including in its description the date of the change and reasons therefor, and shall accompany said description with a letter from the Contractor’s independent certified public accountant approving or otherwise commenting on the changes.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES (continued)

- 6.18.7.4 Contractor shall file with Owner a statement of management as to whether the system of internal controls of Contractor and its subsidiaries reasonably assures that: (1) transactions are executed in accordance with management’s general and specific authorization; (2) transactions are recorded as necessary to (i) permit preparation of financial statements in conformity with generally accepted accounting principles, and (ii) to maintain accountability for assets; (3) access to assets is permitted only in accordance with management’s general or specific authorization; and (4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action was taken with respect to any difference.
- 6.18.7.5 Contractor shall also make and file with Owner a statement prepared by an independent certified public accountant, stating that such certified public accountant has examined the statement of management on internal accounting controls, and expressing an opinion as to (1) whether the representations of management in respond to this Subsection and the Subsections 6.18.7.1, 6.18.7.2, 6.18.7.3, and 6.18.7.4 above are consistent with the result of management’s evaluation of the system of internal accounting controls; and (2) whether such representations of management are, in addition, reasonable with respect to transactions and assets in amounts which would be material when measured in relation to Contractor’s financial statements.
- 6.18.7.6 Contractor must file, prior to the execution of the Contract, and must annually thereafter throughout the term of the Contract, an audited financial statement for the most recent completed fiscal year prepared by an independent certified public accountant on the basis of an audit by such accountant. The final statement filed shall include the date of Final Payment. All statements shall be accompanied by an accountant’s report, and such statements shall be made available to Owner upon request.
- 6.18.7.7 The records and statements required by this Subsection 6.18.7 shall not be public records, as defined in M.G.L. Chapter 4, Section 7, and shall not be open to public inspection; provided, however, that such records and statements shall be made available to the Office of Inspector General, and the Commissioner of Capital Asset Management and Maintenance as set forth above and in M.G.L. Chapter 30, Section 39R.

7. ARTICLE 7 – LAWS AND REGULATIONS:**7.1 LAWS TO BE OBSERVED**

- 7.1.1 Contractor shall keep fully informed of and comply with all federal and Commonwealth of Massachusetts Legal Requirements, including, but not limited to, the applicable Sections of Chapter 30 and Chapter 149 of the Massachusetts General Laws, and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the Work, or which in any way affect the conduct of the Work.

ARTICLE 7 – LAWS AND REGULATIONS (continued)

- 7.1.2 Contractor shall at all times observe and comply with all such Legal Requirements, orders and decrees; and shall defend and indemnify Owner, Railroad and Indemnified Parties from and against claim or liability arising from or based on the violation of any such Legal Requirement, order, or decree whether by Contractor, Subcontractor(s), or any employee of either.
- 7.1.3 Except where otherwise expressly required by applicable Legal Requirements, neither Owner nor Railroad shall be responsible for monitoring Contractor's compliance with any Legal Requirements.

7.2 SANITARY PROVISIONS

- 7.2.1 Contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of its employees and Owner's and Railroad's representatives in strict accordance with the requirements of the State and local Boards of Health, OSHA or of other bodies or tribunals having jurisdiction.

7.3 MINIMUM WAGE RATES

- 7.3.1 The minimum wage rates to be used for this Contract are shown on Document 00861 State Prevailing Wage Rates and Document 00880 Minimum Wages for Federal and Federally Assisted Contracts. The rates shown on these schedules are the minimum to be paid during the life of the Contract. It is, therefore, the responsibility of Bidders to inform themselves as to the local labor conditions such as the length of the work day and work week, overtime compensation, health and welfare contributions, labor supply and prospective changes or adjustment of rates. In the event of conflict between the schedules for any classifications, the greater amount for the classification shall prevail as the minimum wage rate.
- 7.3.2 Contractor shall pay to any reserve police officer employed in carrying out the Work in any city or town the prevailing rate of wage paid to regular police officers in such city or town (M.G.L. c. 149, sec. 34B).
- 7.3.3 If Contractor finds it necessary during the progress of the Work to secure a minimum wage rate for some additional classification, Contractor shall make a request for such additional classification to Owner to obtain the additional classification and corresponding minimum wage rate from the Commonwealth of Massachusetts Department of Labor Standards ("DLS") and advise Contractor of the same. These additional classifications and minimum wage rates are then to be considered a part of the Contract, and Contractor shall have no claim for additional compensation because of any additional classification and minimum wage rates.
- 7.3.4 Where a question arises as to the classification in the schedule of the DLS in which any employee is to be included, the decision is to be made by DLS, through their duly authorized representative.
- 7.3.5 The aforesaid rates of wages in the schedule of wage rates shall include payments by employers to health and welfare plans, and such payments shall be considered as payments to persons under this section performing work as provided herein. Any employer engaged in the construction of such Work who does not make payments to health and welfare plan where such payments are included in said rates of wages shall pay the amount of said payments directly to each employee engaged in said construction.

ARTICLE 7 – LAWS AND REGULATIONS (continued)

7.4 WAGES AND HOURS OF LABOR

- 7.4.1 In accordance with M.G.L c. 149, Section 34, no laborer, workman, mechanic, foreman or inspector working within the commonwealth, in the employ of the contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.
- 7.4.2 Contractor shall maintain certified payrolls bearing an original signature for Owner on a weekly basis and shall retain copies of the payrolls for a minimum of three (3) years.
- 7.4.3 The certification shall affirm that the payrolls are current and complete, that the wage rates contained therein are not less than any applicable rates referenced in the Contract Documents, and that the classification set forth for each laborer or mechanic conforms with the work he performed.
- 7.4.4 Contractor shall attend all hearings and conferences and produce such books, papers, and documents all as requested by Owner.

8. ARTICLE 8 – CHANGES:**8.1 OWNER'S RIGHT TO CHANGE**

- 8.1.1 Without invalidating the Contract, Owner may give direction and/or approval, order additions, deletions or other modifications to the Work.

8.2 DIRECTIVE

- 8.2.1 Owner shall provide written clarification or interpretation of the Contract Documents pursuant to Section 3.7.
- 8.2.2 Owner may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Amount or the Contract Time and are consistent with the overall intent of the Contract Documents.
- 8.2.3 Owner may order Contractor to correct defective work or methods which are not in conformance with the Contract Documents.

8.3 CHANGE ORDER

- 8.3.1 A change in Contract Time, Contract Amount, or responsibility may be made for changes within the scope of the Work only by Change Order which must be requested and approved in advance of performing any Work by Contractor, via the Change Order Form in Appendix E.
- 8.3.2 Upon receipt of an executed Change Order indicating approval of the Work by Owner, Contractor shall promptly proceed with the Work involved, and such Work will be performed under the applicable conditions of the Contract Documents except as otherwise specifically provided.
- 8.3.3 Changes in Contract Amount and Contract Time shall be made in accordance with Articles 9 and 10. NO ADDITIONAL WORK SHALL BE UNDERTAKEN, NO ADDITIONAL COSTS OR EXTENSIONS OF TIME MAY BE CONSIDERED OR OCCUR WITHOUT OWNER'S EXPRESS WRITTEN AUTHORIZATION, IN ADVANCE.
- 8.3.4 All alterations, extensions of time, extra work and any other changes authorized under these specifications, or under any part of the Contract may be made by MassDOT.

ARTICLE 8 – CHANGES (continued)

- 8.3.5 The Contractor shall be responsible for notifying the surety or sureties regarding changes to the Contract Amount. The Contractor shall provide evidence of revised bond.
- 8.3.6 Where the Contract utilizes additional artisans, equipment rental, materials, engineering services and specialty services to complete work assignments approved by the Engineer, the Contractor is responsible for additional bond associated with the increased value of the Contract.

8.4 UNAUTHORIZED WORK

- 8.4.1 Contractor shall not be entitled to an increase in the Contract Amount or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in this Article 8, except in the case of an emergency as provided in Section 6.15.

8.5 DIFFERING SITE CONDITIONS (M.G.L. c. 30, sec. 39N)

- 8.5.1 If, during the progress of the work, the contractor or the awarding authority discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the contract documents either the contractor or the contracting authority may request an equitable adjustment in the contract price of the contract applying to work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a contractor, or upon its own initiative, the contracting authority shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the contract documents or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the plans and contract documents and are of such a nature as to cause an increase or decrease in the cost of performance of the work or a change in the construction methods required for the performance of the work which results in an increase or decrease in the cost of the work, the contracting authority shall make an equitable adjustment in the contract price and the contract shall be modified in writing accordingly. For purposes of Subsection 8.5.1 above, the terms “awarding authority” and “contracting authority” shall refer to Owner.
- 8.5.2 Contractor shall promptly, and before such conditions are disturbed (except in an emergency as permitted by Section 6.15), notify Owner in writing of:
 - 8.5.2.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the Contract, and which could not have been discovered by a careful examination of the site, or
 - 8.5.2.2 Physical conditions at the site of an unknown or an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in this Contract.
- 8.5.3 Owner shall promptly investigate the conditions, and if Owner finds that such conditions do materially so differ and cause an increase or decrease in Contractor's cost of, or time required for performance of this Contract, an equitable adjustment shall be made, and the Contract shall be modified in writing accordingly.

ARTICLE 8 – CHANGES (continued)

- 8.5.4 Any claim for additional compensation by Contractor pursuant to this Section shall be made in accordance with Article 14 and shall not be allowed unless Contractor has first given the notice required by this Contract.
- 8.5.5 In the event that Owner and Contractor are unable to reach an agreement concerning an alleged differing site condition, Contractor will be required to keep an accurate and detailed record which will indicate the actual cost of the Work performed as a result of the alleged differing site condition.
- 8.5.6 Failure to keep such a record shall be a bar to any recovery by reason of such alleged differing site conditions. Owner shall be given the opportunity to supervise and check the keeping of such records.

9. ARTICLE 9 – CONTRACT AMOUNT – COMPUTATION AND CHANGE:**9.1 CONTRACT AMOUNT**

- 9.1.1 The Contract Amount constitutes the total compensation (subject to authorized adjustments) payable to Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the Contract Amount. The Contract Amount may only be changed by written Change Order.

9.2 CLAIM FOR CHANGE IN CONTRACT AMOUNT

- 9.2.1 Any claim for an increase or decrease in the Contract Amount shall be submitted in accordance with the terms of this Article 9, and shall not be allowed unless the notice requirements of this Contract have been met.

9.3 CHANGE ORDER PRICE DETERMINATION

- 9.3.1 The value of any Work covered by a Change Order for an increase or decrease in the Contract Amount shall be determined in one of the following ways:
 - 9.3.1.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of Section 9.9).
 - 9.3.1.2 By mutual acceptance of a lump sum price which includes overhead and profit.
- 9.3.2 When Subsections 9.3.1.1 and 9.3.1.2 do not apply, on the basis of the Cost of the Work (determined as provided in Sections 9.4 and 9.5) plus a Contractor's fee for overhead and profit (determined as provided in Section 9.6).
- 9.3.3 Owner must approve any proposed changes to Time or Cost of Work by written Authorization before the Change Order is issued.

9.4 COST OF THE WORK

- 9.4.1 The term Cost of the Work means the sum of all costs actually incurred and necessary to carry out the Work and paid by Contractor in the proper performance of the Work.
- 9.4.2 Except as otherwise may be agreed to in writing by Owner, such costs shall be in amount no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Section 9.5:
 - 9.4.2.1 Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor.

ARTICLE 9 – CONTRACT AMOUNT – COMPUTATION AND CHANGE (continued)

- 9.4.2.2 Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work.
- 9.4.2.3 Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include Social Security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto.
- 9.4.2.4 Such employees shall include superintendents and foremen at the site.
- 9.4.2.5 The expenses of performing Work after regular working hours, on Saturday, Sunday or Legal Holidays shall be included in the above to the extent authorized by Owner.
- 9.4.2.6 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
- 9.4.2.7 Costs of special Consultants (including but not limited to engineers, architects, testing laboratories, and surveyors) employed for services necessary for the completion of the Work.
- 9.4.2.8 Supplemental costs including the following:
 - 9.4.2.8.1 The proportion of necessary transportation, travel and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - 9.4.2.8.2 Costs, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by Contractor, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed, and which remain the property of Contractor.
 - 9.4.2.8.3 Rentals of all construction equipment and machinery and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner and the costs of transportation, loading, unloading, installation, dismantling and removal thereof - all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.
 - 9.4.2.8.4 Sales, consumer, use or similar taxes related to the Work, and for which Contractor is liable.
 - 9.4.2.8.5 Fees for permits and licenses.

ARTICLE 9 – CONTRACT AMOUNT – COMPUTATION AND CHANGE (continued)

- 9.4.2.8.6 Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by Contractor in connection with the performance and furnishing of the Work, provided they have resulted from causes other than the negligence of Contractor, any Contractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee. If, however, any such loss or damage requires reconstruction and Contractor is placed in charge thereof, Contractor shall be paid for services a fee in accordance with Section 9.6.
- 9.4.2.8.7 The cost of utilities, fuel and sanitary facilities at the site.
- 9.4.2.8.8 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work
- 9.4.2.8.9 Cost of premiums for additional bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by Owner in accordance with Article 5.

9.5 EXCLUDED COSTS

9.5.1 The term Cost of the Work shall not include any of the following:

- 9.5.1.1 Payroll costs and other compensation of Contractor's officers, executives, principles (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agency, expeditors, timekeepers, clerks and other personnel employed by Contractor whether at the site or in Contractor's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Subsection 9.4.2.1 - all of which are to be considered administrative costs covered by Contractor's Fee.
- 9.5.1.2 Expenses of Contractor's principal and branch offices.
- 9.5.1.3 Any part of Contractor's capital expenses including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 9.5.1.4 Cost of premiums for all insurance whether or not Contractor is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by Subsection 9.4.2.8.9 above).
- 9.5.1.5 Costs due to the negligence of Contractor, any subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective work, disposal of materials or equipment wrongly supplied and making good any damage to property.

ARTICLE 9 – CONTRACT AMOUNT – COMPUTATION AND CHANGE (continued)

9.5.1.6 Costs for the use of small tools having a value of five hundred dollars (\$500) or less.

9.5.1.7 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Section 9.4.

9.6 CONTRACTOR'S FEE

9.6.1 Contractor's fee allowed to Contractor for overhead and profit shall be a negotiated, mutually agreed upon fixed fee between Contractor and Owner. Contractor's fee shall be identified in the Contract between Owner and Contractor and shall apply to both originally bid Work and any work Authorized by approved Change Order. If no fee can be agreed upon, a fee based on the following percentages of the various portions of the cost of the Work:

9.6.1.1 For costs incurred under Subsections 9.4.2.1 through 9.4.2.6, Contractor's Fee shall be 5%;

9.6.1.2 For costs incurred under Subsections 9.4.2.7 and 9.4.2.8 Contractor's Fee shall be 5%.

9.6.2 No fee shall be payable on the basis of costs itemized under Section 9.5;

9.6.3 The amount of credit to be allowed by Contractor to Owner for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in Contractor's fee by a mutually agreed upon amount, or, if none can be agreed upon, then an amount equal to 5% of the net decrease; and

9.6.4 When both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Subsections 9.6.1.1 and 9.6.1.2.

9.7 COST BREAKDOWN

9.7.1 Whenever the cost of any Work is to be determined pursuant to Sections 9.4 and 9.5, Contractor will submit an itemized cost breakdown together with supporting data in a form acceptable to Owner.

9.8 UNIT PRICE WORK

9.8.1 Where the Contract Documents provide that all or part of the work is to be Unit Price Work, initially the Contract Amount will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Contract.

9.8.2 The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Amount.

9.8.3 Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Owner in accordance with Section 9.9.

9.8.4 Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

9.8.5 If the "Basis of Payment" clause in the Contract Documents relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain Work or material essential to the item, this same Work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the Contract Documents.

ARTICLE 9 – CONTRACT AMOUNT – COMPUTATION AND CHANGE (continued)

- 9.8.6 Payment to Contractor shall be made only for the actual quantities of Work performed and accepted or materials furnished, in conformance with the Contract Documents.
- 9.8.7 When the accepted quantities of Work or materials vary from the quantities stated in the bid schedule, or change documents, Contractor shall accept as payment in full, payment at the stated unit prices for the accepted quantities or Work and materials furnished, completed and accepted.

9.9 DETERMINATIONS REGARDING UNIT PRICES AND QUANTITIES

- 9.9.1 Owner will determine the actual quantities and classifications of Unit Price Work performed by Contractor.
- 9.9.2 Owner's certification thereon will be final and binding on Contractor, unless, within ten (10) days after the date of any such decision, Contractor delivers to Owner written notice of intention to appeal from such a decision.

10. ARTICLE 10 – CONTRACT TIME – COMPUTATION & CHANGE:**10.1 COMMENCEMENT OF CONTRACT TIME – NOTICE TO PROCEED**

- 10.1.1 The Contract Time will commence to run on the day indicated in the Notice to Proceed.

10.2 STARTING THE WORK

- 10.2.1 No Work on Contract items shall be performed before the effective date of the Notice to Proceed. Contractor shall notify Owner and Railroad at least forty-eight (48) hours in advance of the time actual construction operations will begin.

10.3 COMPUTATION OF CONTRACT TIME

- 10.3.1 When the Contract Time is specified on a calendar days basis, all Work under the Contract shall be completed within the number of calendar days specified.
- 10.3.2 The count of Contract Time begins on the day following receipt of the Notice to Proceed by Contractor, if no starting day is stipulated therein.
- 10.3.3 Calendar days shall continue to be counted against Contract Time until and including the date of Final Completion of the Work.
- 10.3.4 When the Contract completion time is specified as a fixed calendar date, it shall be the date of Final Completion.

10.4 TIME CHANGE

- 10.4.1 The Contract Time may only be changed by a Change Order. Any extension for time needs to be approved by Owner in advance.

10.5 EXTENSION DUE TO DELAYS

- 10.5.1 The right of Contractor to proceed shall not be terminated nor Contractor charged with liquidated or actual damages because of any delays to the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of Contractor, including, but not restricted to the following: acts of God; acts of Owner; acts of another Contractor in the performance of a contract with Owner or Railroad; floods, fires, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather; and delays of Subcontractors or suppliers due to such causes.

ARTICLE 10 – CONTRACT TIME – COMPUTATION AND CHANGE (continued)

- 10.5.2 Any delay in receipt of materials on the site, caused by other than one of the specifically mentioned occurrences above, does not of itself justify a time extension.
- 10.5.3 Owner shall ascertain the facts and the extent of the delay and extend the time for completing the Work when the findings of fact justify such an extension.

10.6 ESSENCE OF CONTRACT

- 10.6.1 All time limits stated in the Contract Documents are of the essence to the Contract.

10.7 REASONABLE COMPLETION TIME

- 10.7.1 It is expressly understood and agreed by and between Contractor and Owner that the date of beginning and the time for Final Completion of the Work described herein are reasonable times for the completion of the Work.

10.8 DELAY IN COMPLETION OF THE WORK; LIQUIDATED DAMAGES

- 10.8.1 In the event that Contractor does not proceed with the Work within the time frame stipulated in the Contract Documents or otherwise fails to perform the other work specified in the Contract Documents in reasonable accordance with the Project Schedule, so as to complete the Work on or before the time for Final Completion, Owner may terminate the Contract, and seek to complete the Work pursuant to the provisions of and with funding provided by Contractor's Performance Bond.
- 10.8.2 Whether or not Contractor's right to proceed with the Work is terminated, Contractor shall be liable for damages resulting from Contractor's refusal or failure to complete the Work within the specified time. **Note: Liquidated damages for delay shall be paid by Contractor to Owner in the amount of \$1,000 for each calendar day the completion of the Work or any part thereof is delayed beyond the Contract Time required by the Contract, or any extension thereof.**
- 10.8.3 Contractor acknowledges that the liquidated damages established herein are not a penalty but rather constitute an estimate of damages that Owner will sustain by reason of delayed completion. These liquidated damages are intended as compensation for losses that are difficult to estimate.
- 10.8.4 These damages will continue to run both before and after termination in the event of default termination. These liquidated damages do not cover excess costs of completion, Owner' costs, fees, and charges related to solicitation and selection of an alternative work force to complete the Work.

11. ARTICLE 11 – QUALITY ASSURANCE:**11.1 WARRANTY AND GUARANTY**

- 11.1.1 Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective.
- 11.1.2 Prompt notice of all defects shall be given to Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided for in this Article.

11.2 ACCESS TO WORK

- 11.2.1 Owner, Railroad, their representatives, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. Contractor shall provide proper and safe conditions for such access.

ARTICLE 11 – QUALITY ASSURANCE (continued)**11.3 TESTS AND INSPECTIONS**

- 11.3.1 Contractor shall give Owner and Railroad timely notice of readiness of the Work for all required inspections.

11.4 OWNER MAY STOP THE WORK

- 11.4.1 If the Work is defective, or Contractor fails to supply suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; provided, however, that the right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise the right for the benefit of Contractor or any other party.

11.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK

- 11.5.1 If required by Owner, Contractor shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by Owner, remove it from the site and replace it with Work which conforms to the requirements of the Contract Documents. Contractor shall bear all direct, indirect and consequential costs of such correction removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

11.6 ONE YEAR CORRECTION PERIOD

- 11.6.1 If within one (1) year after the date of Final Completion or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, either correct such defective Work, or, if it has been rejected by Owner, remove it from the site and replace it with conforming Work.
- 11.6.2 If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by Contractor.

11.7 ACCEPTANCE OF DEFECTIVE WORK

- 11.7.1 Instead of requiring correction or removal and replacement of defective Work, Owner may accept defective Work. All decisions with respect to acceptance of defective Work are solely at the discretion of, and to be made by, Owner. In the event of Owner's decision to accept defective Work, Contractor shall bear all direct, indirect and consequential costs attributable to Owner's evaluation of and determination to accept such defective Work (costs to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals).
- 11.7.2 Any acceptance of defective Work, as described in Subsection 11.7.1, shall only be contemplated upon written notification and request by Owner supported by documentation to support the request.

ARTICLE 11 – QUALITY ASSURANCE (continued)

- 11.7.3 If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and Owner shall be entitled to an appropriate decrease in the Contract Amount.

12. ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION:**12.1 SCHEDULE OF VALUES**

- 12.1.1 The schedule of values or progress payment values established as provided in Section 6.5 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Owner. Progress payments on account of Unit Price Work will be based on the number of units completed.

12.2 PRELIMINARY PAYMENTS

- 12.2.1 Upon approval of the schedule of values Contractor may be paid for direct costs substantiated by paid invoices and other prerequisite documents required by the Contract Documents. Direct costs shall include the cost of bonds, insurance, approved materials stored on the site or at approved remote storage sites, deposits required by a supplier prior to fabricating materials, and other approved direct mobilization costs substantiated as indicated above. These payments shall be included as a part of the total Contract Amount as stated in the Contract.

12.3 APPLICATION FOR PROGRESS PAYMENT

- 12.3.1 Contractor shall submit to Owner for review a complete and accurate Application for Payment signed by Contractor covering the Work completed as of the date of the Application for Payment and accompanied by such supporting documentation as required by the Contract Documents.
- 12.3.2 Progress payments will be made as the Work progresses on a monthly basis.

12.4 REVIEW OF APPLICATION FOR PROGRESS PAYMENT

- 12.4.1 Owner will either provide a written recommendation for payment, or return the Application for Payment to Contractor indicating in writing Owner's reasons for refusing to recommend payment.
- 12.4.2 If the latter case, Contractor shall make the necessary corrections and resubmit the Application for Payment.

12.5 PAYMENTS TO SUBCONTRACTORS (M.G.L. c. 30, sec. 39F)

- 12.5.1 In accordance with M.G.L. Chapter 30, Section 39F, the following subparagraphs (a) through (h) shall be binding between the Contractor and each Subcontractor.

(a) Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

**ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (M.G.L. c. 30, sec. 39F)
(continued)**

(b) Not later than the sixty–fifth day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

(c) Each payment made by the awarding authority to the general contractor pursuant to subparagraphs (a) and (b) of this paragraph for the labor performed and the materials furnished by a subcontractor shall be made to the general contractor for the account of that subcontractor; and the awarding authority shall take reasonable steps to compel the general contractor to make each such payment to each such subcontractor. If the awarding authority has received a demand for direct payment from a subcontractor for any amount which has already been included in a payment to the general contractor or which is to be included in a payment to the general contractor for payment to the subcontractor as provided in subparagraphs (a) and (b), the awarding authority shall act upon the demand as provided in this section.

(d) If, within seventy days after the subcontractor has substantially completed the subcontract work, the subcontractor has not received from the general contractor the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, the subcontractor may demand direct payment of that balance from the awarding authority. The demand shall be by a sworn statement delivered to or sent by certified mail to the awarding authority, and a copy shall be delivered to or sent by certified mail to the general contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the subcontract and also a statement of the status of completion of the subcontract work. Any demand made after substantial completion of the subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the subcontractor has substantially completed the subcontract work. Within ten days after the subcontractor has delivered or so mailed the demand to the awarding authority and delivered or so mailed a copy to the general contractor, the general contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the awarding authority and a copy shall be delivered to or sent by certified mail to the subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor and of the amount due for each claim made by the general contractor against the subcontractor.

ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (continued)

(e) Within fifteen days after receipt of the demand by the awarding authority, but in no event prior to the seventieth day after substantial completion of the subcontract work, the awarding authority shall make direct payment to the subcontractor of the balance due under the subcontract including any amount due for extra labor and materials furnished to the general contractor, less any amount (i) retained by the awarding authority as the estimated cost of completing the incomplete or unsatisfactory items of work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the general contractor in the sworn reply; provided, that the awarding authority shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by subparagraph (d). The awarding authority shall make further direct payments to the subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this subparagraph.

(f) The awarding authority shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of subparagraph (e) in an interest-bearing joint account in the names of the general contractor and the subcontractor in a bank in Massachusetts selected by the awarding authority or agreed upon by the general contractor and the subcontractor and shall notify the general contractor and the subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the general contractor and the subcontractor or as determined by decree of a court of competent jurisdiction.

(g) All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to subparagraph (f) shall be made out of amounts payable to the general contractor at the time of receipt of a demand for direct payment from a subcontractor and out of amounts which later become payable to the general contractor and in the order of receipt of such demands from subcontractors. All direct payments shall discharge the obligation of the awarding authority to the general contractor to the extent of such payment.

(h) The awarding authority shall deduct from payments to a general contractor amounts which, together with the deposits in interest-bearing accounts pursuant to subparagraph (f), are sufficient to satisfy all unpaid balances of demands for direct payment received from subcontractors. All such amounts shall be earmarked for such direct payments, and the subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the general contractor.

- 12.5.2 “Subcontractor” as used in Subsection 12.5.1 shall mean a person approved by MassDOT in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the general contractor, and shall also mean a person contracting with the general contractor to supply materials used or employed in a public works project for a price in excess of five thousand dollars.

ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (continued)

- 12.5.2.1 Forthwith after the general contractor receives payment on account of a periodic estimate, the general contractor shall pay to each subcontractor the amount paid for the labor performed and the materials furnished by that subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.
- 12.5.2.2 Not later than the sixty-fifth day after each subcontractor substantially completes his work in accordance with the plans and specifications, the entire balance due under the subcontract less amounts retained by the awarding authority as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the subcontractor; and the awarding authority shall pay that amount to the general contractor. The general contractor shall forthwith pay to the subcontractor the full amount received from the awarding authority less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the subcontractor by the general contractor.

12.6 WITHHOLDING OF PAYMENTS

- 12.6.1 Owner may withhold or refuse payment for any of the reasons listed below provided it gives written notice of its intent to withhold and of the basis for withholding:
 - 12.6.1.1 The Work is defective, or completed Work has been damaged requiring correction or replacement, or has been installed without approved shop drawings, or by an unapproved Contractor.
 - 12.6.1.2 The Contract Amount has been reduced by Change Order.
 - 12.6.1.3 Owner or Railroad has been required to correct Defective Work or complete Work in accordance with Section 12.10.
 - 12.6.1.4 Owner's or Railroad's actual knowledge of the occurrence of any of the events enumerated in Subsections 13.2.1.1 through 13.2.1.12 inclusive.
 - 12.6.1.5 Claims have been made against Owner on account of Contractor's actions or inactions in performing this Contract, or there are other items entitling Owner to a set-off.
 - 12.6.1.6 Subsequently discovered evidence or the results of subsequent inspections or tests, nullify any previous payments for reasons stated in Subsections 12.6.1.1 through 12.6.1.5.
 - 12.6.1.7 Contractor has failed to fulfill or is in violation of any of its obligations under any provision of this Contract.

ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (continued)**12.7 RETAINAGE**

- 12.7.1 A percentage of a Contractor's Application for Payment may be withheld if, in Owner's judgment, a portion of the Work for which payment is requested has not been completed according to the Project Plans and Specifications. The percentage withheld will be commensurate with the proportion of the incomplete Work in relation to the total amount of the Application for Payment. Any amount withheld shall be promptly processed for payment upon satisfactory completion and acceptance of the Work.

12.8 SUBSTANTIAL COMPLETION (M.G.L. c. 30, sec. 39G)

- 12.8.1 Upon substantial completion of the work required by a contract with the commonwealth, or any agency or political subdivision thereof, for the construction, reconstruction, alteration, remodeling, repair or improvement of public ways, including bridges and other highway structures, sewers and, water mains, airports and other public works, the contractor shall present in writing to the awarding authority its certification that the work has been substantially completed. Within twenty-one days thereafter, the awarding authority shall present to the contractor either a written declaration that the work has been substantially completed or an itemized list of incomplete or unsatisfactory work items required by the contract sufficient to demonstrate that the work has not been substantially completed. The awarding authority may include with such list a notice setting forth a reasonable time, which shall not in any event be prior to the contract completion date, within which the contractor must achieve substantial completion of the work. In the event that the awarding authority fails to respond, by presentation of a written declaration or itemized list as aforesaid, to the contractor's certification within the twenty-one day period, the contractor's certification shall take effect as the awarding authority's declaration that the work has been substantially completed.
- 12.8.2 Within sixty-five days after the effective date of a declaration of a substantial completion, the awarding authority shall prepare and forthwith send to the contractor for acceptance a substantial completion estimate for the quantity and price of the work done and all but one per cent retainage, if held by the awarding authority, on that work, including the quantity, price and all but one per cent retainage, if held by the awarding authority, for the undisputed part of each work item and extra work item in dispute but excluding the disputed part thereof, less the estimated cost of completing all incomplete and unsatisfactory work items and less the total periodic payments made to date for the work. The awarding authority also shall deduct from the substantial completion estimate an amount equal to the sum of all demands for direct payment filed by subcontractors and not yet paid to subcontractors or deposited in joint accounts pursuant to section thirty-nine F, but no contract subject to said section thirty-nine F shall contain any other provision authorizing the awarding authority to deduct any amount by virtue of claims asserted against the contract by subcontractors, material suppliers or others.
- 12.8.3 If the awarding authority fails to prepare and send to the contractor any substantial completion estimate required by this section on or before the date herein above set forth, the awarding authority shall pay to the contractor interest on the amount which would have been due to the contractor pursuant to such substantial completion estimate at the rate of three percentage points above the rediscount rate then charged by the Federal Reserve Bank of Boston from such date to the date on which the awarding authority sends that substantial completion estimate to the contractor for acceptance or to the date of payment therefor, whichever occurs first. The awarding authority shall include the amount of such interest in the substantial completion estimate.

ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (continued)

- 12.8.4 Within fifteen days after the effective date of the declaration of substantial completion, the awarding authority shall send to the contractor by certified mail, return receipt requested, a complete list of all incomplete or unsatisfactory work items, and, unless delayed by causes beyond his control, the contractor shall complete all such work items within forty-five days after the receipt of such list or before the then contract completion date, whichever is later. If the contractor fails to complete such work within such time, the awarding authority may, subsequent to seven days' written notice to the contractor by certified mail, return receipt requested, terminate the contract and complete the incomplete or unsatisfactory work items and charge the cost of same to the contractor
- 12.8.5 Within thirty days after receipt by the awarding authority of a notice from the contractor stating that all of the work required by the contract has been completed, the awarding authority shall prepare and forthwith send to the contractor for acceptance a final estimate for the quantity and price of the work done and all retainage, if held by the awarding authority, on that work less all payments made to date, unless the awarding authority's inspection shows that work items required by the contract remain incomplete or unsatisfactory, or that documentation required by the contract has not been completed. If the awarding authority fails to prepare and send to the contractor the final estimate within thirty days after receipt of notice of completion, the awarding authority shall pay to the contractor interest on the amount which would have been due to the contractor pursuant to such final estimate at the rate hereinabove provided from the thirtieth day after such completion until the date on which the awarding authority sends the final estimate to the contractor for acceptance or the date of payment therefor, whichever occurs first, provided that the awarding authority's inspection shows that no work items required by the contract remain incomplete or unsatisfactory. Interest shall not be paid hereunder on amounts for which interest is required to be paid in connection with the substantial completion estimate as hereinabove provided. The awarding authority shall include the amount of the interest required to be paid hereunder in the final estimate.
- 12.8.6 The awarding authority shall pay the amount due pursuant to any substantial completion or final estimate within thirty-five days after receipt of written acceptance for such estimate from the contractor and shall pay interest on the amount due pursuant to such estimate at the rate hereinabove provided from that thirty-fifth day to the date of payment. Within 15 days, 30 days in the case of the commonwealth, after receipt from the contractor, at the place designated by the awarding authority, if such place is so designated, of a periodic estimate requesting payment of the amount due for the preceding periodic estimate period, the awarding authority shall make a periodic payment to the contractor for the work performed during the preceding periodic estimate period and for the materials not incorporated in the work but delivered and suitably stored at the site, or at some location agreed upon in writing, to which the contractor has title or to which a subcontractor has title and has authorized the contractor to transfer title to the awarding authority, upon certification by the contractor that he is the lawful owner and that the materials are free from all encumbrances. The awarding authority shall include with each such payment interest on the amount due pursuant to such periodic estimate at the rate herein above provided from the due date. In the case of periodic payments, the contracting authority may deduct from its payment a retention based on its estimate of the fair value of its claims against the contractor, a retention for direct payments to subcontractors based on demands for same in accordance with the provisions of section thirty-nine F, and a retention to secure satisfactory performance of the contractual work not exceeding five per cent of the approved amount of any periodic payment, and the

ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (continued)

same right to retention shall apply to bonded subcontractors entitled to direct payment under section thirty-nine F of chapter thirty; provided, that a five per cent value of all items that are planted in the ground shall be deducted from the periodic payments until final acceptance.

12.8.7 No periodic, substantial completion or final estimate or acceptance or payment thereof shall bar a contractor from reserving all rights to dispute the quantity and amount of, or the failure of the awarding authority to approve a quantity and amount of, all or part of any work item or extra work item.

12.8.8 Substantial completion, for the purposes of this section, shall mean either that the work required by the contract has been completed except for work having a contract price of less than one per cent of the then adjusted total contract price, or substantially all of the work has been completed and opened to public use except for minor incomplete or unsatisfactory work items that do not materially impair the usefulness of the work required by the contract

12.9 ACCESS FOLLOWING SUBSTANTIAL COMPLETION

12.9.1 Owner and Railroad shall have the right to exclude Contractor from the site after the date of Substantial Completion, provided that, Owner and Railroad shall allow Contractor reasonable access to the Project site to complete or correct Work items identified in Subsection 12.8.3.

12.10 FINAL INSPECTION

12.10.1 Upon written notice from Contractor that the entire Work is complete, Owner's Authorized Representative(s) will make a final inspection with Contractor and Railroad, and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective.

12.10.2 Contractor shall promptly take such measures as are necessary to remedy such deficiencies.

12.10.3 Contractor shall pay for all costs incurred by Owner (including Railroad's charges) resulting from re-inspections.

12.11 FINAL APPLICATION FOR PAYMENT

12.11.1 After Contractor has completed all such corrections to the satisfaction of Owner, and has delivered all guarantees, bonds, certificates of payment to all laborers, subcontractors and suppliers, certificates of inspection, marked-up record documents and other documents, all as required by the Contract Documents, and after Owner has indicated that the Work is acceptable (subject to the provisions of Section 12.13), Contractor may make application for final payment following the procedure for progress payments (the "Final Application for Payment").

12.11.2 The Final Application for Payment shall be accompanied by two (2) copies of all certificates, warranties, guaranties, releases, affidavits, and other documentation required by the Contract Documents. These two (2) copies shall be submitted to Owner and shall be a condition of Final Payment by Owner.

12.11.3 All requirements of Subsections 6.12.4 through 6.12.6 must be met prior to Owner approval and payment of the Final Application for Payment.

ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (continued)**12.12 FINAL PAYMENT AND FINAL COMPLETION**

- 12.12.1 If, on the basis of Owner's and Railroad's observation of the Work during construction and final inspection, and Owner's review of the Final Application for Payment and accompanying documentation all as required by the Contract Documents, Owner is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Owner will make payment of the Final Application for Payment.
- 12.12.2 Otherwise, Owner will return the Final Application for Payment to Contractor, indicating in writing the reasons for refusing to process final payment, in which case Contractor shall make the necessary corrections and resubmit the application for final payment.
- 12.12.3 If, through no fault of Contractor, final completion of the Work is significantly delayed, Owner shall, upon receipt of Contractor's Final Application for Payment, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted.
- 12.12.4 Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

12.13 FINAL ACCEPTANCE

- 12.13.1 Following receipt of Contractor's release with no exceptions, and certification that laborers, subcontractors and material men have been paid, certification of payment of payroll and revenue taxes, and final payment to Contractor, Owner will issue a letter of Final Completion, releasing Contractor from further obligations under the Contract, except as provided in Section 12.14.

12.14 CONTRACTOR'S CONTINUING OBLIGATION

- 12.14.1 Contractor's obligation to perform and complete the Work and pay all laborers, subcontractors, and material in accordance with the Contract Documents shall be absolute.
- 12.14.2 Neither any progress or final payment by Owner, nor the issuance of a Certificate of Substantial Completion, nor any use or occupancy of the Work or any part thereof by Owner or Railroad, nor any act of acceptance by Owner nor any failure to do so, nor any correction of defective Work by Railroad or Owner will constitute an acceptance of Work not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents.

12.15 WAIVER OF CLAIMS BY CONTRACTOR

- 12.15.1 The making and acceptance of final payment will constitute a waiver of all claims by Contractor against Owner, and/or Railroad, other than those previously made in writing and that remain unsettled.

12.16 NO WAIVER OF LEGAL RIGHTS

- 12.16.1 Owner shall not be precluded or be estopped by any payment, measurement, estimate, or certificate made either before or after the completion and acceptance of the Work and payment therefore, from showing the true amount and character of the Work performed and materials furnished by Contractor, nor from showing that any payment, measurement, estimate or certificate is untrue or is incorrectly made, or that the Work or materials are defective.

ARTICLE 12 – PAYMENTS TO CONTRACTOR AND COMPLETION (continued)

- 12.16.2 Owner shall not be precluded or be estopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from Contractor such damages as it may sustain by reason of Contractor's failure to comply with requirements of the Contract Documents.
- 12.16.3 Neither the acceptance by Owner, or any representative of Owner, nor any payment for or acceptance of the whole or any part of the Work, nor any extension of the Contract Time, nor any possession taken by Owner or Railroad, shall operate as a waiver of any portion of the Contract or of the power herein reserved, or of any right to damages.
- 12.16.4 A waiver by Owner of any breach of the Contract shall not be held to be a waiver of any other subsequent breach.

13. ARTICLE 13 – SUSPENSION OF WORK – DEFAULT AND TERMINATION:**13.1 OWNER MAY SUSPEND WORK****13.1.1 General (M.G.L. c. 30, sec. 39O)**

- 13.1.1.1 The awarding authority may order the general contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as it may determine to be appropriate for the convenience of the awarding authority; provided however, that if there is a suspension, delay or interruption for fifteen days or more or due to a failure of the awarding authority to act within the time specified in this contract, the awarding authority shall make an adjustment in the contract price for any increase in the cost of performance of this contract but shall not include any profit to the general contractor on such increase; and provided further, that the awarding authority shall not make any adjustment in the contract price under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this contract provides for an equitable adjustment of the contract price under any other contract provisions.
- 13.1.1.2 The general contractor must submit the amount of a claim under Subsection 13.1.1.1 to the awarding authority in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than the date of final payment under this contract and, except for costs due to a suspension order, the awarding authority shall not approve any costs in the claim incurred more than twenty days before the general contractor notified the awarding authority in writing of the act or failure to act involved in the claim.
- 13.1.1.3 For purposes of this Subsection 13.1.1: the term "awarding authority" shall refer to Owner; the term "general contractor" shall refer to Contractor; the term "contract" shall mean the Contract

ARTICLE 13 – SUSPENSION OF WORK – DEFAULT AND TERMINATION (continued)

- 13.1.2 Owner may, at any time, suspend the Work or any portion thereof by written notice to Contractor. If the Work is suspended without cause Contractor shall be allowed an increase in the Contract Amount or an extension of the Contract Time, or both, directly attributable to any suspension if Contractor makes an approved claim therefore as provided in Article 14. Any action by Owner to allow an increase in the Contract Amount or to allow an extension of the Contract Time may only be done with the prior written authorization of Owner. Owner shall not be liable to Contractor for any additions to the Contract Amount or extensions in the Contract Time that it has not approved in writing in advance.
- 13.1.3 However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that suspension is due to the fault or negligence of the Contractor, or that suspension is necessary for Contract compliance, or that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or Acts of God (which shall be deemed to include severe weather conditions precluding prosecution of the Work).
- 13.1.4 In case of suspension of Work, Contractor shall be responsible for preventing damage to or loss of any of the Work already performed and of all materials whether stored on or off the site or approved remote storage sites.

13.2 DEFAULT OF CONTRACTOR**13.2.1 If Contractor:**

- 13.2.1.1 Fails to begin the Work under the Contract within the time specified in the Contract Documents, or
- 13.2.1.2 Fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workmen or suitable materials or equipment or failure to adhere to the progress schedule established under Sections 6.5 and 6.6 as revised from time to time), or
- 13.2.1.3 Performs the Work unsuitably or neglects or refuses to remove materials or to correct defective Work, or
- 13.2.1.4 Discontinues the prosecution of the Work, or
- 13.2.1.5 Fails to resume Work which has been discontinued within a reasonable time after notice to do so, or
- 13.2.1.6 Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency except as prohibited by 11 U.S.C. 363, or
- 13.2.1.7 Allows any final judgment to stand against him unsatisfied for period of sixty (60) days, or
- 13.2.1.8 Makes an assignment for the benefit of creditor without the consent of Owner, or
- 13.2.1.9 Disregards requirements or orders of any public body having jurisdiction, or
- 13.2.1.10 Otherwise violates in any substantial way any provisions of the Contract Documents, or
- 13.2.1.11 For any cause whatsoever, fails to carry on the Work in an acceptable manner, or

ARTICLE 13 – SUSPENSION OF WORK – DEFAULT AND TERMINATION (continued)

13.2.1.12 Fails to provide and maintain any insurance policy as set forth herein,

Owner may give Notice in writing to Contractor of such delay, neglect, or default (“Notice of Default”).

- 13.2.2 If Contractor, within the time specified in the above Notice of Default, shall not proceed in accordance therewith, then Owner may, upon written notification to Contractor and Contractor’s surety of the fact of such delay, neglect or default and Contractor’s failure to comply with such notice, have full power and authority without violating the Contract, to take the prosecution of the Work out of the hands of Contractor.
- 13.2.3 Owner may terminate the services of Contractor, exclude Contractor from the site and take possession of the Work, and obtain and expend funds from the Performance Bond and the Payment Bond (as applicable) to complete the Work as required by the Contract Documents.
- 13.2.4 Owner may enter into an agreement for the completion of said Contract Work according to the terms and provisions of the Contract, or use such other methods that in the opinion of Owner are required for the completion of said Contract in an acceptable manner.
- 13.2.5 Owner may, by written notice to Contractor, transfer the completion of the Work from Contractor to another organization, or, if Contractor abandons the Work undertaken under the Contract, Owner may, at its option and without any written notice to Contractor, transfer the completion of the Work to another organization.

13.3 RIGHTS OR REMEDIES

- 13.3.1 Where Contractor’s services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue.
- 13.3.2 Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

14. ARTICLE 14 – CLAIMS AND DISPUTES:**14.1 OWNER’S DECISION**

- 14.1.1 With regard to any claim or dispute raised by Contractor, Owner will make a determination of the validity and disposition of the claim or dispute and Contractor will be furnished with Owner’s decision within ninety (90) days of the receipt of the claim or dispute unless additional information is requested by Owner. Owner’s decision is final and conclusive unless fraudulent as to the claim.

14.2 NOTICE OF APPEAL

- 14.2.1 Within fourteen (14) days of receipt of Owner’s decision, Contractor may deliver a Notice of Appeal to Owner and request a hearing.
- 14.2.2 The Notice of Appeal shall include specific exceptions to Owner’s decision, including specific provisions of the Contract, which Contractor intends to rely upon in the appeal.
- 14.2.3 General assertions that Owner’s decision is contrary to law or to fact shall not be deemed sufficient.

ARTICLE 14 – CLAIMS AND DISPUTES (continued)**14.3 OWNER'S DECISION ON APPEAL**

- 14.3.1 The decision of Owner on appeal will be rendered within ninety (90) days after the receipt of the Notice of Appeal.
- 14.3.2 The time limits given above may be extended by mutual consent.
- 14.3.3 The decision of Owner on appeal shall be final and conclusive.

15. ARTICLE 15 – MISCELLANEOUS:**15.1 GOVERNING LAW**

- 15.1.1 This Contract shall be governed by the laws of the Commonwealth of Massachusetts.

15.2 CONTRACT CLAUSES / SEVERABILITY

- 15.2.1 If any contract clause is declared null and void, then all other clauses shall remain in force.

NOTICE OF AVAILABILITY OF COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, 2024
Edition.

Certain sections/subsections of The COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, 2024 Edition, are referenced in these Contract Documents and Special Provisions. The Commonwealth of Massachusetts Department Transportation Standard Specifications for Highways and Bridges, 2024 Edition, as amended by Document 00715 SUPPLEMENTAL SPECIFICATIONS, are available online at [Construction specifications | Mass.gov](#)

SPECIAL PROVISIONS FOR RIGHT-TO-KNOW ACT REQUIREMENTS

The Contractor's attention is directed to Massachusetts General Laws, Chapter 111F, commonly known as the Right-To-Know Act, and to the regulations promulgated pursuant thereto. Among the provisions of the Right-To-Know Act is a requirement that employers make available to employees Materials Safety Data Sheets (MSDS) for any substance on the Massachusetts Substance List (MSL) to which employees are, have been, or may be exposed.

To ensure prompt compliance with these regulations and legislation, the Contractor shall:

1. Deliver to the Department, prior to the start of any work under this contract, copies of MSDS for all MSL substances to be used, stored, processed or manufactured at the worksite by the Contractor.
2. Train employees of the Department, who may be exposed to MSL substances as a result of the Contractor's work under this contract, with regard to those specific substances in accordance with requirements of the Right-To-Know Act.
3. Observe all safety precautions recommended on the MSDS for any MSL substance to be used, stored, processed, or manufactured at the worksite by the Contractor.
4. Inform the Department in writing regarding specific protective equipment recommended in the MSDS for MSL substances to which employees of the Department may be exposed as a result of the Contractor's work under this contract.

ARTICLE 15 – MISCELLANEOUS (continued)

MassDOT shall not be liable for any delay or suspension of work caused by the refusal of its employees to perform any work due to the Contractor's failure to comply with the Right-To-Know Act. The Contractor agrees to hold MassDOT or the Secretary and CEO of MassDOT harmless and fully indemnified for any and all claims, demands, fines, actions, complaints, and causes of action resulting from or arising out of the Contractor's failure to comply with the requirements of the Right-To-Know Act.

ALTERNATIVE DISPUTE RESOLUTION**Forum, Choice of Law and Mediations:**

Any actions arising out of a contract shall be governed by the laws of Massachusetts and shall be brought and maintained in a State or federal court in Massachusetts which shall have exclusive jurisdiction thereof. MassDOT and the Contractor may both agree to mediation of any claim and will share the costs of such mediation pro rata based on the number of parties involved.

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DOCUMENT 00719

**SPECIAL PROVISIONS FOR PARTICIPATION BY
DISADVANTAGED BUSINESS ENTERPRISES**
(IMPLEMENTING TITLE 49 OF THE CODE OF FEDERAL REGULATIONS, PART 26)

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POLICY

The Massachusetts Department of Transportation (MassDOT) receives Federal financial assistance from the Federal Highway Administration (FHWA), United States Department of Transportation (U.S. DOT), and as a condition of receiving this assistance, has signed an assurance that it will comply with 49 CFR Part 26 (Participation By Disadvantaged Business Enterprises In Department Of Transportation Financial Assistance Programs). The U.S. DOT

Disadvantaged Business Enterprise Program is authorized by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users ("SAFETEA-LU"), as amended, at Title 23, United States Code, § 1101.

Accordingly, MassDOT has established a Disadvantaged Business Enterprise (DBE) Program in accordance with 49 CFR Part 26. It is the policy of MassDOT to ensure that DBEs have an equal opportunity to receive and participate in U.S. DOT assisted Contracts, without regard to race, color, national origin, or sex. To this end, MassDOT shall not directly, or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the program objectives stated below:

- ◆ To ensure nondiscrimination in the award and administration of U.S. DOT assisted Contracts;
- ◆ To create a level playing field on which DBEs can compete fairly for U.S. DOT assisted Contracts;
- ◆ To ensure that the DBE Program is narrowly tailored in accordance with applicable law;
- ◆ To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are permitted to participate as DBEs;
- ◆ To help remove barriers to the participation of DBEs in U.S. DOT assisted Contracts; and
- ◆ To assist the development of firms that can compete successfully in the market place outside the DBE Program.

The Director of Civil Rights of MassDOT has been designated as the DBE Liaison Officer. The DBE Liaison Officer is responsible for implementing all aspects of the DBE Program. Other MassDOT employees are responsible for assisting the Office of Civil Rights in carrying out this obligation. Implementation of the DBE Program is accorded the same priority as compliance with all other legal obligations incurred by MassDOT in its financial assistance agreements with each operating administration of the U.S. DOT. Information on the Federal requirements and MassDOT's policies and information can be found at:

<i>Type of Info</i>	<i>Website</i>	<i>Description</i>
MassDOT Highway Division Policies and Info	https://www.mass.gov/disadvantaged-business-enterprise-goals-2019-2022	MassDOT– Highway Div’n Page
For copies of the Code of Federal Regulations	http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR	FDsys – US Gov’t Printing Office

For information about the U.S.DOT DBE Program	https://www.transportation.gov/civil-rights/disadvantaged-business-enterprise	U.S. DOT/FHWA page
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1. DEFINITIONS

As used in these provisions, the terms set out below are defined as follows:

“Broker”, for purposes of these provisions, shall mean a DBE Entity that has entered into a legally binding relationship to provide goods or services delivered or performed by a third party. A broker may be a DBE Entity that arranges or expedites transactions but performs no work or installation services.

“Contractor”, “General” or “Prime” Contractor, “Bidder,” and “DB Entity” shall mean a person, firm, or other entity that has contracted directly with MassDOT to provide contracted work or services.

“Contract” shall mean the Contract for work between the Contractor and MassDOT.

“DBB” or “Design-Bid-Build” shall mean the traditional design, bid and project delivery method consisting of separate contracts between awarding authority and a designer resulting in a fully designed project; and a separate bidding process and Contract with a construction Contractor or Bidder.

“DB” or “Design-Build” shall mean an accelerated design, bid and project delivery method consisting of a single contract between the awarding authority and a DB Entity, consisting of design and construction companies that will bring a project to full design and construction.

“Disadvantaged Business Enterprise” or “DBE” shall mean a for-profit, small business concern:

- (a) that is at least fifty-one (51%) percent owned by one or more individuals who are both socially and economically disadvantaged, or, in the case of any corporation, in which at least fifty-one (51%) percent of the stock is owned by one or more such individuals; and
- (b) where the management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

“FHWA” shall mean the Federal Highway Administration,” an agency within U.S. DOT that supports State and local governments in the design, and maintenance of the Nation’s highway system (Federal Aid Highway Program).

“Good faith efforts” shall mean efforts to achieve a DBE participation goal or other requirement of these Special Provisions that, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement. Such efforts must be deemed acceptable by MassDOT.

“Joint Venture” shall mean an association of a DBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the Contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

“Approved Joint Venture” shall mean a joint venture, as defined above, which has been approved by MassDOT’s Prequalification Office and Office of Civil Rights for DBE participation on a particular Contract.

"Manufacturer" shall mean a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles or equipment required under the contract and of the general character described by the specifications.

"Regular Dealer" shall mean a DBE firm that owns, operates, or maintains a store, warehouse, or other establishment in which materials, supplies, articles or equipment of the general character described by the specifications and required under the Contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

- (a) To be a regular dealer, the firm must be an established, regular business that engages, as its principal business, and under its own name, in the purchase and sale of the products in question.
- (b) A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided above if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by long term lease agreement and not on an ad hoc or contract by contract basis.
- (c) Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this definition.

"Responsive" and "Responsible" refers to the bidder's submittal meeting all of the requirements of the advertised request for proposal. The term responsible refers to the ability of the Contractor to perform the work. This ability can be determined prior to bid invitations.

"Small Business or Small Business Concern" shall mean a small business concern or company as defined in Section 3 of the Small Business Act and SBA regulations implementing it (13 CFR Part 121); and is a business that does not exceed the cap on annual average gross receipts established by the U.S. Secretary of Transportation pursuant to 49 CFR Part 26.65; see also 49 CFR Part 26.39.

"SDO" shall mean the Massachusetts Supplier Diversity Office, formerly known as the State Office of Minority and Women Business Assistance (SOMWBA). In 2010, SOMWBA was abolished and the SDO was established. *See* St. 2010, c. 56. The SDO has assumed all the functions of SOWMBA. SDO is an agency within the Commonwealth of Massachusetts Executive office of Administration and Finance (ANF) Operational Services Division (OSD). The SDO mandate is to help promote the development of business enterprises and non-profit organizations owned and operated by minorities and women.

"Socially and economically disadvantaged individuals" shall mean individuals who are citizens of the United States (or lawfully admitted permanent residents) and who are:

- (a) Individuals found by SDO to be socially and economically disadvantaged individuals on a case by case basis.
- (b) Individuals in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:

- (1) "Black Americans" which includes persons having origin in any of the Black racial groups of Africa; (2) "Hispanic Americans" which include persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race; (3) "Native Americans" which include persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians; (4) "Asian Pacific Americans" which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Tuvalu, Nauru, Federated States of Micronesia, or Hong Kong; (5) "Subcontinent Asian Americans" which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka; (6) Women; or (7) Any additional groups whose members are designated as socially and economically disadvantaged by the Small Business Administration (SBA), at such time as the SBA designation becomes effective.

Other terms and definitions applicable to the U.S. DOT DBE Program may be found at 49 CFR Part 26 and related appendices and guidance pages.

2. DBE PARTICIPATION

a. Goal

On this Contract, MassDOT has established the following goal(s) for participation by firms owned and controlled by socially and economically disadvantaged persons. At least half of the goal must be met in the form of DBE Subcontractor construction activity as opposed to material supplies or other services. The applicable goal remains in effect throughout the life of the contract regardless of whether pre-identified DBE Subcontractors remain on the Project or under Contract.

☐ Design-Bid-Build Projects: DBE Participation Goal ____%
(One half of this goal shall be met in the form of Subcontractor construction activity)

☐ Design-Build Projects: DBE Design Participation Goal ____% and DBE Construction Participation Goal ____%
(One half of the Construction Goal shall be met in the form of Subcontractor construction activity)

b. Bidders List

Pursuant to the provisions of 49 CFR Part 26.11(c), Recipients such as MassDOT, must collect from all Bidders who seek work on Federally assisted Contracts the firm full company name(s), addresses and telephone numbers of all firms that have submitted bids or quotes to the Bidders in connection with this Project. All bidders should refer to the Special Provision Document "A00801" of the Project proposal for this requirement.

In addition, MassDOT must provide to U.S. DOT, information concerning contractors firm status as a DBE or non-DBE, the age of the firm, and the annual gross receipts of the firm within a series of brackets (e.g., less than \$500,000; \$500,000–\$1 million; \$1–2 million; \$2–5 million, etc.). The status, firm age, and annual gross receipt information will be sought by MassDOT regularly prior to setting its DBE participation goal for submission to U.S. DOT. MassDOT will survey each individual firm for this information directly.

Failure to comply with a written request for this information within fifteen (15) business days may result in the suspension of bidding privileges or other such sanctions, as provided for in Section 9 of this provision, until the information is received.

3. CONTRACTOR ASSURANCES

No Contractor or any Subcontractor shall discriminate on the basis of race color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in all respects and as applicable prior to, or subsequent to, award of U.S. DOT assisted Contracts. The Contractor agrees to affirmatively seek out and consider DBE firms as Contractors, Subcontractors, and/or suppliers of materials and services for this Contract. No Contract will be approved until MassDOT has reviewed Bidders'/Contractors' affirmative actions concerning DBEs. Failure to carry out these requirements is a material breach of this Contract which may result in the termination of the Contract or such other remedy as MassDOT or FHWA deem appropriate.

4. REQUIRED SUBCONTRACT PROVISIONS

The Prime Contractor shall include the provisions of Section 3 above in every subcontract, making those provisions binding on each Subcontractor; in addition, the Prime Contractor shall include a copy of this Special Provision, in its entirety, in every subcontract with a DBE firm which is, or may be, submitted for credit toward the Contract participation goal.

5. ELIGIBILITY OF DBES

Only firms that have been certified by SDO and confirmed by MassDOT as eligible in accordance with 49 CFR Part 26 to participate as DBEs on federally aided MassDOT Contracts may be used on this Contract for credit toward the DBE participation goal.

a. Massachusetts DBE Directory

MassDOT makes available to all bidders the most current Massachusetts Disadvantaged Business Enterprise Directory. This directory is made available for Contractors' convenience and is informational only. The Directory lists those firms that have been certified as eligible in accordance with the criteria of 49 CFR Part 26 to participate as DBEs on federally aided MassDOT contracts. The Directory also lists the kinds of work each firm is certified to perform but does not constitute an endorsement of the quality of performance of any business and does not represent MassDOT Subcontractor approval.

Contractors are encouraged to make use of the DBE Directory maintained by SDO on the Internet.

This listing is updated daily and may be accessed at the SDO's website at:

<https://www.diversitycertification.mass.gov/BusinessDirectory/BusinessDirectorySearch.aspx>

b. DBE Certification

A firm must apply to SDO, currently acting as certification agent for MassDOT, for DBE certification to participate on federally aided MassDOT Contracts. A DBE application may be made in conjunction with a firm's application to SDO for certification to participate in state-funded minority and women business enterprise programs or may be for DBE certification only. An applicant for DBE certification must identify the area(s) of work it seeks to perform on U.S. DOT funded projects.

c. Joint Venture Approval

To obtain recognition as an approved DBE Joint Venture, the parties to the joint venture must provide to MassDOT's Office of Civil Rights and Prequalification Office, at least fourteen (14) business days before the bid opening date, an Affidavit of DBE/Non-DBE Joint Venture in the form attached hereto, and including, but not limited to the following:

1. a copy of the Joint Venture Agreement;
2. a description of the distinct, clearly defined portion of the contract work that the DBE will perform with its own forces; and,
3. all such additional information as may be requested by MassDOT for the purpose of determining whether the joint venture is eligible.

6. COUNTING DBE PARTICIPATION TOWARDS DBE PARTICIPATION GOALS

In order for DBE participation to count toward the Contract participation goal, the DBE(s) must have served a commercially useful function in the performance of the Contract and must have been paid in full for acceptable performance.

a. Commercially Useful Function

- (1) In general, a DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. With respect to materials and supplies used on the Contract, the DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing (where applicable) and paying for the material itself.
- (2) To determine whether a DBE is performing a commercially useful function, MassDOT will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.
- (3) A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, MassDOT will examine similar transactions, particularly those in which DBEs do not participate.

b. Counting Participation Toward The Contract Participation Goal

DBE participation which serves a commercially useful function shall be counted toward the DBE participation goal in accordance with the Provisions of 49 CFR Part 26.55(a) to (h), as follows:

- (1) When a DBE participates in a construction Contract, MassDOT will count the value of the work performed by the DBE's own forces. MassDOT will count the cost of supplies and materials obtained by the DBE for the work of its contract, including supplies purchased or equipment leased by the DBE. Supplies, labor, or equipment the DBE Subcontractor uses, purchases, or leases from the Prime Contractor or any affiliate of the Prime Contractor will not be counted.

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- (2) MassDOT will count the entire amount of fees or commissions charged by a DBE firm for providing bona fide services, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a U.S. DOT assisted Contract, toward DBE participation goals, provided it is determined that the fee is reasonable and not excessive as compared with fees customarily allowed for similar services.
- (3) When a DBE performs as a participant in a joint venture, MassDOT will count toward DBE participation goals a portion of the total dollar value of the contract that is equal to the distinct, clearly defined portion of the work of the Contract that the DBE performs with its own forces.
- (4) MassDOT will use the following factors in determining whether a DBE trucking company is performing a commercially useful function:
- (i) the DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract; there cannot be a contrived arrangement for the purpose of meeting DBE participation goals.
 - (ii) the DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the Contract.
 - (iii) the Contractor will receive DBE credit for the total value of the transportation services the DBE provides on the Contract using trucks owned, insured, and operated by the DBE itself and using drivers the DBE employs alone.
 - (iv) the DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The Contractor who has a contract with a DBE who leases trucks from another DBE will receive credit for the total value of the transportation services of the lease.
 - (v) the DBE may also lease trucks from a non-DBE firm, including an owner-operator. The Contractor who has a Contract with a DBE who leases trucks from a non-DBE is entitled to credit for the total value of the transportation services provided by non-DBE lessees not to exceed the value of transportation services provided by DBE-owned trucks on the Contract. Additional participation by non-DBE lessees receives credit only for the fee or commission it receives as a result of the lease arrangement, fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.
 - (vi) the lease must indicate that the DBE has exclusive use of, and control over, the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.
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(5) MassDOT will count the Prime Contractor's expenditures with DBEs for materials or supplies toward DBE participation goals as follows:

- (i) if the materials or supplies are obtained from a DBE manufacturer, as defined in Section 1 above, MassDOT will count one hundred (100%) percent of the cost of the materials or supplies toward DBE participation goals, provided the DBE meets the other requirements of the regulations.
- (ii) if the materials or supplies are purchased from a DBE regular dealer, as defined in Section 1 above, MassDOT will count sixty (60%) percent of the cost of the materials or supplies toward the Contract participation goal, provided the DBE meets the other requirements of the regulations.
- (iii) for materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, MassDOT will count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site toward the Contract participation goal, provided that MassDOT determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services; the cost of the materials and supplies themselves will not be counted; and provided the DBE meets the other requirements of the regulations.

c. Joint Check Policy

MassDOT recognizes that the use of joint checks may be a business practice required by material suppliers and vendors in the construction industry. A joint check is a two-party check issued by a/the Prime Contractor to a DBE third party such as a regular dealer of material or supplies. The Prime Contractor issues the check as payor to the DBE and the third party jointly as payees to guarantee payment to the third party for materials or supplies obtained or to be used by the DBE. FHWA has established criteria to ensure that DBEs are in fact performing a commercially useful function ("CUF") while using a joint check arrangement. Contractors and DBEs must meet and conform to these conditions and criteria governing the use of joint checks.

In the event that a Contractor or DBE Subcontractor desires to use a joint check, MassDOT will require prior notice and will closely monitor the arrangement for compliance with FHWA regulations and guidance. MassDOT may allow a joint check arrangement and give credit to a Contractor for use of the DBE where one or more of the following conditions exist:

- The use of a joint check is in fact required by this type of vendor or supplier as a standard industry practice that applies to all Contractors (DBEs and non-DBEs); or is required by a specific vendor or supplier;
- Payment for supplies or materials would be delayed for an unreasonably extended period without the joint check arrangement;
- The DBE (or any of its Subcontractors) has a pattern or history of not paying a vendor or supplier within a reasonable time or has not established enough of a credit history with the supplier or vendor; and/or
- The presence of severe adverse economic conditions, where credit resources may be limited and such practices may be necessary or required to effect timely payments.

Other factors MassDOT may consider:

- Whether there is a requirement by the Prime Contractor that a DBE should use a specific vendor or supplier to meet their Subcontractor specifications;
- Whether there is a requirement that a DBE use the Prime Contractor's negotiated price;
- The independence of the DBE;
- Whether approval has been sought prior to use of a joint check arrangement; and
- Whether any approved joint check arrangement has exceeded a reasonable period of use;
- The operation of the joint check arrangement; and
- Whether the DBE has made an effort to establish alternate arrangements for following periods (i.e., the DBE must show it can, or has, or why it has not, established or increased a credit line with the vendor or supplier).

Even with the use of a Joint Check, both the Contractor and DBE remain responsible for compliance with all other elements under 49 CFR § 26.55 (c) (1), and must still be able to prove that a commercially useful function is being performed for the Contractor.

d. Joint Check Procedure(s)

- The DBE advises its General or Prime Contractor that it will have to use a Joint Check and provide proof of such requirement.
- The General or the Prime Contractor submits a request for approval to MassDOT, using MassDOT's approved Joint Check Request form (Document B00855) and by notification on the DBE Letter of Intent (Document B00854), and any other relevant documents. Requests that are not initiated during the bid process should be made in writing and comply with the procedure.
- The MassDOT Office of Civil Rights will review the request and render a decision as part of the approval process for DBE Schedules and Letters of Intent.
- Review and Approval will be project specific and relevant documents will be made part of the project Contract file.
- Payments should be made in the name of both the DBE and vendor or supplier. Payments should be issued and signed by the Contractor as only the guarantor for prompt payment of purchases to the vendor or supplier. The payment to the vendor or supplier should be handled by the DBE (i.e. if possible, funds or the joint check should be processed by the DBE and sent by the DBE to the vendor or supplier).
- MassDOT may request copies of cancelled checks (front and back) and transmittal information to verify any payments made to the DBE and vendor or supplier.
- MassDOT may request other information and documents, and may ask questions of the Contractor, Subcontractor and vendor or supplier prior to, during, and after the project performance to ascertain whether the Subcontractor is performing a commercially useful function and all parties are complying with DBE Program policies and procedures as part of the Subcontractor approval process.

7. AWARD DOCUMENTATION AND PROCEDURES

- a. The two lowest bidders/the two bidders with the lowest price per quality score point, shall submit, by the close of business on the third (3rd) business day after the bid opening, a completed Schedule of Participation by DBEs (Document B00853) which shall list:

- (1) The full company name, address and telephone number of each DBE with whom the bidder intends to make a commitment.
- (2) The contract item(s), by number(s) and quantity(ies), if applicable, or specific description of other business activity to be performed by each DBE as set forth in the Letters of Intent. The Bidder shall list only firms which have the capacity to perform, manage and supervise the work proposed in accordance with the requirements of 49 CFR Part 26 and Section 6.b of these Special Provisions.
- (3) The total dollar amount to be paid to each DBE. (Bidders are cautioned that at least one half of the participation goal must be met with construction activity work.)
- (4) The total dollar amount to be paid to each DBE that is eligible for credit toward the DBE participation goal under the counting rules set out in Section 6.b.
- (5) The total creditable DBE participation as a percentage of the total bid price.

- b. All firms listed on the Schedule must be currently certified.

- c. The two lowest bidders/the two bidders with the lowest price per quality score point, shall each submit, with their Schedules of Participation, fully completed, signed Letters of Intent (Document B00854) from each of the DBEs listed on the Schedule. The Letters of Intent shall be in the form attached and shall identify specifically the contract activity the DBE proposes to perform, expressed as contract item number, if applicable, description of the activity, NAICS code, quantity, unit price and total price. In the event of discrepancy between the Schedule and the Letter of Intent, the Letter of Intent shall govern.

- d. Evidence of good faith efforts will be evaluated by MassDOT in the selection of the lowest responsible bidder.

All information requested by MassDOT for the purpose of evaluating the Contractor's efforts to achieve the participation goal must be provided within three (3) calendar days and must be accurate and complete in every detail. The apparent low bidder's attainment of the DBE participation goal or a satisfactory demonstration of good faith efforts is a prerequisite for award of the Contract.

- e. Failure to meet, or to demonstrate good faith efforts to meet, the requirements of these Special Provisions shall render a bid non-responsive. Therefore, in order to be eligible for award, the bidder (1) must list all DBE's it plans to employ on the Schedule of Participation; and provide the required Letters of Intent for, DBE participation which meets or exceeds the Contract goal in accordance with the terms of these Special Provisions or (2) must demonstrate, to the satisfaction of MassDOT, that good faith efforts were made to achieve the participation goal. MassDOT will adhere to the guidance provided in Appendix A to 49 CFR Part 26 on the determination of a Contractor's good faith efforts to meet the DBE participation goal(s) set forth in Section 2 herein.

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- f.** If MassDOT finds that the percentage of DBE participation submitted by the bidder on its Schedule does not meet the Contract participation goal, or that Schedule and Letters of Intent were not timely filed, and that the bidder has not demonstrated good faith efforts to comply with these requirements, it shall propose that the bidder be declared ineligible for award. In that case, the bidder may request administrative reconsideration. Such requests must be sent in writing within three (3) calendar days of receiving notice of proposed ineligibility to: The Office of the General Counsel, Massachusetts Department of Transportation, 10 Park Plaza, Boston, MA, 02116.
- g.** If, after administrative reconsideration, MassDOT finds that the bidder has not shown that sufficient good faith efforts were made to comply with the requirements of these Special Provisions, it shall reject the bidder's proposal and may retain the proposal guaranty.
- h.** Actions which constitute evidence of good faith efforts to meet a DBE participation goal include, but are not limited to, the following examples, which are set forth in 49 CFR Part 26, Appendix A:
- (1) Soliciting through all reasonable and available means (e.g., attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the Contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
 - (2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE participation goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Prime Contractor might otherwise prefer to perform these work items with its own forces.
 - (3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
 - (4) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE Subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE Subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone number of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.
- A bidder using good business judgment would consider a number of factors in negotiating with Subcontractors, including DBE Subcontractors, and would take a firm's price and capabilities as well as Contract participation goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the Contract DBE participation goal, as long as such costs are reasonable. Also, the ability or desire of a Prime Contractor to perform the work of a Contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime Contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.
- (5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. Contractors should be careful of adding additional requirements of performance that would in effect limit participation by DBEs or any small business. The Contractor's standing within its industry, membership in specific groups, organizations, or
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associations and political or social affiliations (for example union vs. nonunion employee status) are not legitimate causes for the rejection or non-solicitation of bids in the Contractor's efforts to meet the Contract participation goal.

- (6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.
- (7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case by case basis to provide assistance in the recruitment and placement of DBEs.

8. COMPLIANCE

- a. All activity performed by a DBE for credit toward the Contract participation goal must be performed, managed and supervised by the DBE in accordance with all commercially useful function requirements of 49 CFR Part 26. The Prime Contractor shall not enter into, or condone, any other arrangement.
- b. The Prime Contractor shall not perform with its own organization, or assign to any other business, an activity designated for the DBE(s) named on the Schedule(s) submitted by the Prime Contractor under Section 7 or under paragraph 8.f of this section, without the approval of MassDOT in accordance with the requirements of paragraphs 8.f and 8.j of this section.
- c. MassDOT may suspend payment for any activity that was not performed by the DBE to whom the activity was committed on the approved Schedule of Participation, or that was not performed in accordance with the requirements of Section 6.
- d. MassDOT retains the right to approve or disapprove of any or all Subcontractors. Requests by the Prime Contractor for approval of participation by a DBE Subcontractor for credit toward the Contract participation goal must include, in addition to any other requirements for Subcontractor approval, the following:
 - (1) A copy of the proposed subcontract. The subcontract must be for at least the dollar amount, and for the work described, in the Bidder's Schedule of Participation.
 - (2) A resume stating the qualifications and experience of the DBE Superintendent and/or foreperson who will supervise the on-site work. A new resume will be required for any change in supervisory personnel during the progress of the work.
 - (3) A Schedule of Operations indicating when the DBE is expected to perform the work.
 - (4) A list of (1) equipment owned by the DBE to be used on the Project, and (2) equipment to be leased by the DBE for use on the Project.
 - (5) A list of: (1) all projects (public and private) which the DBE is currently performing; (2) all projects (public and private) to which the DBE is committed; and (3) all projects (public and private) to which the DBE intends to make a commitment. For each Contract, list the contracting

organization, the name and telephone number of a contact person for the contracting organization, the dollar value of the work, a description of the work, and the DBE's work schedule for each project.

- e. If, pursuant to the Subcontractor approval process, MassDOT finds that a DBE Subcontractor does not have sufficient experience or resources to perform, manage and supervise work of the kind proposed in accordance with the requirements of 49 CFR Part 26, approval of the DBE Subcontractor may be denied. In the event of such denial, the Prime Contractor shall proceed in accordance with the requirements paragraphs **8.f** and **8.j** of this section.
- f. If, for reasons beyond its control, the Prime Contractor cannot comply with its DBE participation commitment in accordance with the Schedule of Participation submitted under Section 7, the Prime Contractor shall submit to MassDOT the reasons for its inability to comply with its obligations and shall submit, and request approval for, a revised Schedule of Participation. If approved by MassDOT, the revised Schedule shall govern the Prime Contractor's performance in meeting its obligations under these Special Provisions.
- g. A Prime Contractor's compliance with the participation goal in Section 2 shall be determined by reference to the established percentage of the total contract price, provided, however, that no decrease in the dollar amount of a bidder's commitment to any DBE shall be allowed without the approval of MassDOT.
- h. If the contract amount is increased, the Prime Contractor may be required to submit a revised Schedule of Participation in accordance with paragraphs **8.f** and **8.j** of this section.
- i. In the event of the decertification of a DBE scheduled to participate on the Contract for credit toward the participation goal, but not under subcontract, the Contractor shall proceed in accordance with paragraphs **8.f** and **8.j** of this section.
- j. The Prime Contractor shall notify MassDOT immediately of any facts that come to its attention indicating that it may or will be unable to comply with any aspect of its DBE obligation under this Contract.
- k. Any notice required by these Special Provisions shall be given in writing to: (1) the Resident Engineer; (2) the District designated Compliance Officer; and (3) the DBE Liaison Officer, MassDOT Office of Civil Rights, 10 Park Plaza, – 3rd Floor - West, Boston, MA, 02116 and cc'd to the Deputy Chief of External Programs.
- l. The Prime Contractor and its Subcontractors shall comply with MassDOT's Electronic Reporting System Requirements (MassDOT Document 00821) and submit all information required by MassDOT related to the DBE Special Provisions through the Equitable Business Opportunity Solution ("EBO"). MassDOT reserves the right to request reports in the format it deems necessary anytime during the performance of the Contract.
- m. Termination of DBE by Prime Contractor
 - (1) A Prime Contractor shall not terminate a DBE Subcontractor or an approved substitute DBE firm without the prior written consent of MassDOT. This includes, but is not limited to, instances in which a Prime Contractor seeks to perform work originally designated for a DBE Subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

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- (2) MassDOT may provide such written consent only if MassDOT agrees, for reasons stated in its concurrence document, that the Prime Contractor has good cause to terminate the DBE firm.
 - (3) For purposes of this paragraph, good cause includes the following circumstances:
 - (i) The DBE Subcontractor fails or refuses to execute a written contract;
 - (ii) The DBE Subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Good cause, however, does not exist if the failure or refusal of the DBE Subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Prime Contractor;
 - (iii) The DBE Subcontractor fails or refuses to meet the Prime Contractor's reasonable, nondiscriminatory bond requirements.
 - (iv) The DBE Subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
 - (v) The DBE Subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1,200 or applicable State law;
 - (vi) (vii) MassDOT has determined that the listed DBE Subcontractor is not a responsible contractor;
 - (vii) The listed DBE Subcontractor voluntarily withdraws from the Project and provides written notice of its withdrawal;
 - (viii) The listed DBE is ineligible to receive DBE credit for the type of work required;
 - (ix) A DBE owner dies or becomes disabled with the result that the listed DBE Contractor is unable to complete its work on the Contract;
 - (x) Other documented good cause that MassDOT determines compels the termination of the DBE Subcontractor. Good cause, however, does not exist if the Prime Contractor seeks to terminate a DBE it relied upon to obtain the Contract so that the Prime Contractor can self-perform the DBE work or substitute another DBE or non-DBE Contractor after Contract Award.
 - (4) Before transmitting to MassDOT a request to terminate and/or substitute a DBE Subcontractor, the Prime Contractor must give notice in writing to the DBE Subcontractor, with a copy to MassDOT, of its intent to request to terminate and/or substitute, and the reason for the request.
 - (5) The Prime Contractor must give the DBE five (5) business days to respond to the Prime Contractor's notice. The DBE must advise MassDOT and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why MassDOT should not approve the Prime Contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), MassDOT may provide a response period shorter than five (5) business days.
 - (6) In addition to post-award terminations, the provisions of this section apply to pre-award deletions of or substitutions for DBE firms.
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n. Prompt Payment.

Contractors are required to promptly pay Subcontractors under this Prime Contract within ten (10) business days from the receipt of each payment the Prime Contractor receives from MassDOT. Failure to comply with this requirement may result in the withholding of payment to the Prime Contractor until such time as all payments due under this provision have been received by the Subcontractor(s) and/or referral to the Prequalification Committee for action which may affect the Contractor's prequalification status.

9. SANCTIONS

If the Prime Contractor does not comply with the terms of these Special Provisions and cannot demonstrate to the satisfaction of MassDOT that good faith efforts were made to achieve such compliance, MassDOT may, in addition to any other remedy provided for in the Contract, and notwithstanding any other provision in the Contract:

- a.** Retain, in connection with final acceptance and final payment processing, an amount determined by multiplying the total contract amount by the percentage in Section 2, less the amount paid to approved DBE(s) for work performed under the Contract in accordance with the provisions of Section 8.
- b.** Suspend, terminate or cancel this Contract, in whole or in part, and call upon the Prime Contractor's surety to perform all terms and conditions in the Contract.
- c.** In accordance with 720 CMR 5.05(1)(f), modify or revoke the Prime Contractor's Prequalification status or recommend that the Prime Contractor not receive award of a pending Contract. The Prime Contractor may appeal the determination of the Prequalification Committee in accordance with the provisions of 720 CMR 5.06.
- d.** Initiate debarment proceedings pursuant to M.G.L. c. 29 §29F and, as applicable, 2 CFR Parts 180, 215 and 1,200.
- e.** Refer the matter to the Massachusetts Attorney General for review and prosecution, if appropriate, of any false claim or pursuant to M.G.L. c. 12, §§ 5A to 5O (the Massachusetts False Claim Act).
- f.** Refer the matter to the U.S. DOT's Office of the Inspector General or other agencies for prosecution under Title 18, U.S.C. § 1001, 49 CFR Parts 29 and 31, and other applicable laws and regulations.

10. FURTHER INFORMATION; ENFORCEMENT, COOPERATION AND CONFIDENTIALITY.

- a.** Any proposed DBE, bidder, or Contractor shall provide such information as is necessary in the judgment of MassDOT to ascertain its compliance with the terms of this Special Provision. Further, pursuant to 49 CFR, Part 26.107:
 - (1)** If you are a firm that does not meet the eligibility criteria of 49 CFR, Parts 26.61 to 26.73 ("subpart D"), that attempts to participate in a DOT- assisted program as a DBE on the basis of false, fraudulent, or deceitful statements or representations or under circumstances indicating a

serious lack of business integrity or honesty, MassDOT or FHWA may initiate suspension or debarment proceedings against you under 49 CFR Part 29.

- (2) If you are a firm that, in order to meet DBE Contract participation goals or other DBE Program requirements, uses or attempts to use, on the basis of false, fraudulent or deceitful statements or representations or under circumstances indicating a serious lack of business integrity or honesty, another firm that does not meet the eligibility criteria of subpart D, FHWA may initiate suspension or debarment proceedings against you under 49 CFR Part 29.
 - (3) In a suspension or debarment proceeding brought either under subparagraph a.(1) or b.(2) of this section, the concerned operating administration may consider the fact that a purported DBE has been certified by a recipient. Such certification does not preclude FHWA from determining that the purported DBE, or another firm that has used or attempted to use it to meet DBE participation goals, should be suspended or debarred.
 - (4) FHWA may take enforcement action under 49 CFR Part 31, Program Fraud and Civil Remedies, against any participant in the DBE Program whose conduct is subject to such action under 49 CFR Part 31.
 - (5) FHWA may refer to the Department of Justice, for prosecution under 18 U.S.C. 1001 or other applicable provisions of law, any person who makes a false or fraudulent statement in connection with participation of a DBE in any DOT-assisted program or otherwise violates applicable Federal statutes.
- b. Pursuant to 49 CFR Part 26.109, the rules governing information, confidentiality, cooperation, and intimidation or retaliation are as follows:
- (1) Availability of records.

 - (i) In responding to requests for information concerning any aspect of the DBE Program, FHWA complies with provisions of the Federal Freedom of Information and Privacy Acts (5 U.S.C. 552 and 552a). FHWA may make available to the public any information concerning the DBE Program release of which is not prohibited by Federal law.
 - (ii) MassDOT shall safeguard from disclosure to unauthorized persons information that may reasonably be considered as confidential business information, consistent with Federal and Massachusetts General Law (M.G.L. c. 66, § 10, M.G.L. c. 4, §7 (26), 950 CMR 32.00).
 - (2) Confidentiality of information on complainants. Notwithstanding the provisions of subparagraph b.(1) of this section, the identity of complainants shall be kept confidential, at their election. If such confidentiality will hinder the investigation, proceeding or hearing, or result in a denial of appropriate administrative due process to other parties, the complainant must be advised for the purpose of waiving the privilege. Complainants are advised that, in some circumstances, failure to waive the privilege may result in the closure of the investigation or dismissal of the proceeding or hearing.
 - (3) Cooperation. All participants in FHWA's DBE Program (including, but not limited to, recipients, DBE firms and applicants for DBE certification, complainants and appellants, and Contractors using DBE firms to meet Contract participation goals) are required to cooperate fully and

promptly with U.S. DOT and recipient compliance reviews, certification reviews, investigations, and other requests for information. Failure to do so shall be a ground for appropriate action against the party involved (e.g., with respect to recipients, a finding of noncompliance; with respect to DBE firms, denial of certification or removal of eligibility and/or suspension and debarment; with respect to a complainant or appellant, dismissal of the complaint or appeal; with respect to a Contractor which uses DBE firms to meet participation goals, findings of non-responsibility for future Contracts and/or suspension and debarment).

- (4) Intimidation and retaliation. No recipient, Contractor, or any other participant in the program, may intimidate, threaten, coerce, or discriminate against any individual or firm for the purpose of interfering with any right or privilege secured by this part or because the individual or firm has made a complaint, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under this part. If any recipient or contractor violates this prohibition, that entity is in noncompliance with this 49 CFR Part 26.

11. LIST OF ADDITIONAL DOCUMENTS.

- a. The following documents shall be completed and signed by the bidder and designated DBEs in accordance with Section 7 - Award Documentation and Procedures. These documents must be returned by the bidder to MassDOT's Bid Document Distribution Center:
- ☐ Schedule of DBE Participation (Document B00853)
 - ☐ Letter of Intent (Document B00854)
 - ☐ DBE Joint Check Arrangement Approval Form (Document B00855), if Contractor and DBE plan, or if DBE is required to use a Joint Check
- b. The following document shall be signed and returned by Contractor and Subcontractors/DBEs to the MassDOT District Office overseeing the Project, as applicable:
- ☐ Contractor/Subcontractor Certification Form (Document No. 00859) (a checklist of other documents to be included with every subcontract (DBEs and non-DBEs alike)).
- c. The following document shall be provided to MassDOT's Office of Civil Rights and Prequalification Office at least fourteen (14) business days before the bid opening date, if applicable:
- ☐ Affidavit of DBE/Non-DBE Joint Venture (Document B00856)
- d. The following document shall be provided to MassDOT's District Office of Civil Rights within 30 calendar days after the work of the DBE is completed, or no later than 30 calendar days after the work of the DBE is on a completed and processed CQE. This document shall be completed and submitted by the Prime Contractor:
- ☐ Certificate of Completion by a Minority/Women or Disadvantaged Business Enterprise (M/W/DBE) (Form No. CSD-100)

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DOCUMENT 00760

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Government wide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

- A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service

provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as

amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy

the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures

to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the

spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue

hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in

cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. Davis-Bacon and Related Act Provisions

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4).

Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much

of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on

weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program.

Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements.

The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime

contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these

and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

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c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for

lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member

of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the

contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

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DOCUMENT 00820

**THE COMMONWEALTH OF MASSACHUSETTS
SUPPLEMENTAL EQUAL EMPLOYMENT OPPORTUNITY,
NON-DISCRIMINATION AND AFFIRMATIVE ACTION PROGRAM**

I. Definitions

For purposes of this contract,

"Minority" means a person who meets one or more of the following definitions:

- (a) American Indian or Native American means: all persons having origins in any of the original peoples of North America and who are recognized as an Indian by a tribe or tribal organization.
- (b) Asian means: All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian sub-continent, or the Pacific Islands, including, but Not limited to China, Japan, Korea, Samoa, India, and the Philippine Islands.
- (c) Black means: All persons having origins in any of the Black racial groups of Africa, including, but not limited to, African-Americans, and all persons having origins in any of the original peoples of the Cape Verdean Islands.
- (d) Eskimo or Aleut means: All persons having origins in any of the peoples of Northern Canada, Greenland, Alaska, and Eastern Siberia.
- (e) Hispanic means: All persons having their origins in any of the Spanish-speaking peoples of Mexico, Puerto Rico, Cuba, Central or South America, or the Caribbean Islands.

"State construction contract" means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility, or a contract for the construction, reconstruction, alteration, remodeling or repair of a public work undertaken by a department, agency, board, or commission of the commonwealth.

"State assisted construction contract" means a contract for the construction, reconstruction, installation, demolition, maintenance or repair of a building or capital facility undertaken by a political subdivision of the commonwealth, or two or more political subdivisions thereof, an authority, or other instrumentality and whose costs of the contract are paid for, reimbursed, grant funded, or otherwise supported, in whole or in part, by the commonwealth.

II. Equal Opportunity, Non-Discrimination and Affirmative Action

During the performance of this Contract, the Contractor and all subcontractors (hereinafter collectively referred to as "the Contractor") for a state construction contract or a state assisted construction contract, for him/herself, his/her assignees and successors in interest, agree to comply with all applicable equal employment opportunity, non-discrimination and affirmative action requirements, including but not limited to the following:

In connection with the performance of work under this contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability, shall not discriminate in the selection or retention of subcontractors, and shall not discriminate in the procurement of materials and rentals of equipment.

The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising, layoff or termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship or on-the-job training opportunity. The Contractor shall comply with the provisions of chapter 151B of the Massachusetts General Laws, as amended, and all other applicable anti-discrimination and equal opportunity laws, all of which are herein incorporated by reference and made a part of this Contract.

The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Massachusetts Commission Against Discrimination setting forth the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151 B).

In connection with the performance of work under this contract, the Contractor shall undertake, in good faith, affirmative action measures to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. Such affirmative action measures shall entail positive and aggressive measures to ensure nondiscrimination and to promote equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, apprenticeship and on-the-job training programs. A list of positive and aggressive measures shall include, but not be limited to, advertising employment opportunities in minority and other community news media; notifying minority, women and other community-based organizations of employment opportunities; validating all job specifications, selection requirements, and tests; maintaining a file of names and addresses of each worker referred to the Contractor and what action was taken concerning such worker; and notifying the administering agency in writing when a union with whom the Contractor has a collective bargaining agreement has failed to refer a minority or woman worker. These and other affirmative action measures shall include all actions required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, sex, sexual orientation, genetic information, military service, age, ancestry or disability. One purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects.

III. Minority and Women Workforce Participation

Pursuant to his/her obligations under the preceding section, the Contractor shall strive to achieve on this project the labor participation goals contained herein. Said participation goals shall apply in each job category on this project including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers and those classes of work enumerated in Section 44F of Chapter 149 of the Massachusetts General Laws. The participation goals for this project shall be 15.3% for minorities and 6.9% for women. The participation goals, as set forth herein, shall not be construed as quotas or set-asides; rather, such participation goals will be used to measure the progress of the Commonwealth's equal opportunity, non-discrimination and affirmative action program. Additionally, the participation goals contained herein should not be seen or treated as a floor or as a ceiling for the employment of particular individuals or group of individuals.

IV. Liaison Committee

At the discretion of the agency that administers the contract for the construction project there may be established for the life of the contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering the contract for the construction project, hereinafter called the administering agency, a representative from the Office of Affirmative action, and such other representatives as may be designated by the administering agency. The

Contractor (or his/her agent, if any, designated by him/her as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

V. Reports and Records

The Contractor shall prepare projected workforce tables on a quarterly basis when required by the administering agency. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also, when updated, to the administering agency and the Liaison Committee when required.

The Contractor shall prepare weekly reports in a form approved by the administering agency, unless information required is required to be reported electronically by the administering agency, the number of hours worked in each trade by each employee, identified as woman, minority, or non-minority. Copies of these shall be provided at the end of each such week to the administering agency and the Liaison Committee.

Records of employment referral orders, prepared by the Contractor, shall be made available to the administering agency on request.

The Contractor will provide all information and reports required by the administering agency on instructions issued by the administering agency and will permit access to its facilities and any books, records, accounts and other sources of information which may be determined by the administering agency to effect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary non-discrimination, equal opportunity and access and opportunity contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency and shall set forth what efforts he has made to obtain the information.

VI. Access to Work Site

A designee of the administering agency and a designee of the Liaison Committee shall each have a right to access the work site.

VII. Solicitations for Subcontracts, and for the Procurement of Materials and Equipment

In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this contract relative to non-discrimination and equal opportunity.

VIII. Sanctions

Whenever the administering agency believes the General or Prime Contractor or any subcontractor may not be operating in compliance with the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws Chapter 151B), the administering agency may refer the matter to the Massachusetts Commission Against Discrimination ("Commission") for investigation.

Following the referral of a matter by the administering agency to the Massachusetts Commission Against Discrimination, and while the matter is pending before the MCAD, the administering agency may withhold

payments from contractors and subcontractors when it has documentation that the contractor or subcontractor has violated the Fair Employment Practices Law with respect to its activities on the Project, or if the administering agency determines that the contractor has materially failed to comply with its obligations and the requirements of this Section. The amount withheld shall not exceed a withhold of payment to the General or Prime Contractor of 1/100 or 1% of the contract award price or \$5,000, whichever sum is greater, or, if a subcontractor is in non-compliance, a withhold by the administering agency from the General Contractor, to be assessed by the General Contractor as a charge against the subcontractor, of 1/100 or 1% of the subcontractor price, or \$1,000 whichever sum is greater, for each violation of the applicable law or contract requirements. The total withheld from anyone General or Prime Contractor or subcontractor on a Project shall not exceed \$20,000 overall. No withhold of payments or investigation by the Commission or its agent shall be initiated without the administering agency providing prior notice to the Contractor.

If, after investigation, the Massachusetts Commission Against Discrimination finds that a General or Prime Contractor or subcontractor, in commission of a state construction contract or state-assisted construction contract, violated the provisions of the Fair Employment Practices Law, the administering agency may convert the amount withheld as set forth above into a permanent sanction, as a permanent deduct from payments to the General or Prime Contractor or subcontractor, which sanction will be in addition to any such sanctions, fines or penalties imposed by the Massachusetts Commission Against Discrimination.

No sanction enumerated under this Section shall be imposed by the administering agency except after notice to the General or Prime Contractor or subcontractor and an adjudicatory proceeding, as that term is used, under Massachusetts General Laws Chapter 30A, has been conducted.

IX. Severability

The provisions of this section are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

X. Contractor's Certification

After award and prior to the execution of any contract for a state construction contract or a state assisted construction contract, the Prime or General Contractor shall certify that it will comply with all provisions of this Document 00820 Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program, by executing Document 00859 Contractor/Subcontractor Certification Form.

XI. Subcontractor Requirements

Prior to the award of any subcontract for a state construction contract or a state assisted construction contract, the Prime or General Contractor shall provide all prospective subcontractors with a complete copy of this Document 00820 entitled "Supplemental Equal Employment Opportunity, Non- Discrimination and Affirmative Action Program" and will incorporate the provisions of this Document 00820 into any and all contracts or work orders for all subcontractors providing work on the Project. In order to ensure that the said subcontractor's certification becomes a part of all subcontracts under the prime contract, the Prime or General Contractor shall certify in writing to the administering agency that it has complied with the requirements as set forth in the preceding paragraph by executing Document 00859 Contractor/Subcontractor Certification Form.

Rev'd 03/07/14

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DOCUMENT 00821

ELECTRONIC REPORTING REQUIREMENTS CIVIL RIGHTS
PROGRAMS AND CERTIFIED PAYROLL

Implemented on March 2, 2009

Revised June 04, 2019

The Massachusetts Department Of Transportation (MassDOT) has replaced the CHAMP reporting system with Equitable Business Opportunity Solution (EBO), a new web-based civil rights reporting software system. This system is capable of handling both civil rights reporting requirements and certified payrolls. The program's functions include the administration of Equal Employment Opportunity (EEO) requirements, On-The-Job Training requirements (OJT), Disadvantage Business Enterprise (DBE) and/or Minority / Women's Business Enterprise (M/WBE) subcontracting requirements, and the electronic collection of certified payrolls associated with MassDOT projects. In addition, this system is used to generate various data required as part of the American Recovery and Reinvestment Act (ARRA). Contractors are responsible for all coordination with all sub-contractors to ensure timely and accurate electronic submission of all required data.

Contractor and Sub-Contractor EBO User Certification

All contractors and sub-contractors must use the EBO software system. The software vendor, Internet Government Solutions (IGS), has developed an online EBO Training Module that is available to contractors and sub-contractors. This module is a self-tutorial which allows all users in the company to access the training, complete the tutorial, and become certified as EBO users for a one time fee of \$75.00. This is the only cost to contractors and sub-contractors associated with the EBO software system. The online EBO Training Module can be accessed at www.ebotraining.com. Click the "Register My Company" button on the login page to begin your training registration. Questions regarding EBO online training should be directed to Gerry Anguilano, IGS at (440) 238- 1684.

MassDOT will track contractors and sub-contractors who have successfully completed the on-line training module. All persons performing civil rights program and/or certified payroll functions should be EBO certified.

Vetting of Firms and Designated Firm Individuals

Contractors must authorize a Primary Log-In ID Holder who has completed EBO on-line training to have access to the EBO system by completing and submitting the "Request For EBO System Log-In/Password Form" located on the MassDOT website at: <https://www.mass.gov/how-to/how-to-get-an-ebo-login>. Contractors must also agree to comply with the EBO system user agreement located on the MassDOT website.

All subcontracts entered into on a project must include language that identifies the submission and training requirements that the sub-contractor must perform. Sub-contractors will be approved by the respective District Office of MassDOT through the existing approval process. When new sub-contractors, who have not previously worked for MassDOT, are initially selected by a general contractor, the new sub-contractor must be approved by the District before taking the EBO on-line training module.

Interim Reporting Requirements

Until MassDOT is satisfied that the EBO system is fully operational and functioning as designed, contractors and sub-contractors will be required to submit certified payrolls manually. There will be a transition period where dual reporting, through manual and electronic submission, will be required. MassDOT, however, will notify contractors and sub-contractors when they may cease manual submission of certified payrolls.

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DOCUMENT 00859

CONTRACTOR/SUBCONTRACTOR CERTIFICATION FORM

The contractor shall submit this completed document 00859 to MassDOT for each subcontract.

(Contractor) Date: _____

(Subcontractor) ☐ District Approved Subcontractor

Contract No.: 128373 **Project No.** 613915 **Federal Aid No.:** 69A36523420000RLDMA

Location: East Deerfield, MA

Project Description: Repair/Rehabilitation of East Deerfield Intermodal Yard

PART 1 CONTRACTOR CERTIFICATION: I hereby certify, as an authorized official of this company, that to the best of my knowledge, information and belief, the company is in compliance with all applicable federal and state laws, rules, and regulations governing fair labor and employment practices, that the company will not discriminate in their employment practices, that the company will make good faith efforts to comply with the minority employee and women employee workforce participation ratio goals and specific affirmative action steps contained in Contract Document 00820 The Commonwealth of Massachusetts Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program, and that the company will comply with the special provisions and documentation indicated below (as checked).

I further hereby certify, as an authorized official of this company, that the special provisions and documentation indicated below (as checked) have been or are included in, and made part of, the Subcontractor Agreement entered into with the firm named above.

☐ **This is not a Federally-aided construction project**

Document

- ☐ 00718 –Participation By Minority Or Women's Business Enterprises and SDVOBE†
- ☐ 00761 –Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion
- ☐ 00820 – MA Supplemental Equal Employment Opportunity, Non-Discrimination, and Affirmative Action Program
- ☐ 00821 – Electronic Reporting Requirements, Civil Rights Programs, and Certified Payroll 00859 – Contractor/Subcontractor Certification Form (this document)
- ☐ 00860 – MA Employment Laws
- ☐ 00861 – Applicable State Wage Rates in the Contract Proposal**
- ☐ B00842 – MA Schedule of Participation By Minority or Women Business Enterprises (M/WBEs)†
- ☐ B00843 – MA Letter of Intent – M/WBEs†
 - ** Does not apply to Material Suppliers, unless performing work on-site
 - † Applies only if Subcontractor is a M/WBE; only include these forms for the particular M/WBE Entity
- ☐ B00844 - Schedule of Participation By SDVOBE
- ☐ B00845 - Letter of Intent – SDVOBE
- ☐ B00846 – M/WBE or SDVOBE Joint Check Arrangement Approval Form
- ☐ B00847 – Joint Venture Affidavit

☐ **This is a Federally-aided construction project (Federal Aid Number is present)****Document #**

- ☐ 00719 – Special Provisions for Participation by Disadvantaged Business Enterprises†
- ☐ 00760 – Form FHWA 1273 - Required Contract Provisions for Federal-Aid Construction Contracts
- ☐ 00820 – MA Supplemental Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program
- ☐ 00821 – Electronic Reporting Requirements, Civil Rights Programs and Certified Payroll
- ☐ 00859 – Contractor/Subcontractor Certification Form (this document)
- ☐ 00860 – MA Employment Laws
- ☐ 00870 – Standard Federal Equal Employment Opportunity Construction Contract Specifications Executive Order 11246, (41 CFR Parts 60-4.2 and 60-4.3 (Solicitations and Equal Opportunity Clauses)*
- ☐ 00875 – Federal Trainee Special Provisions
- ☐ B00853 – Schedule of Participation by Disadvantaged Business Enterprise†
- ☐ B00854 – Letter of Intent – DBEs†
- ☐ B00855 – DBE Joint Check Arrangement Approval Form
- ☐ B00856 – Joint Venture Affidavit
- ☐ 00861/00880 - Applicable state and federal wage rates from Contract Proposal**

*Applicable only to Contracts or Subcontracts in excess of \$10,000

**Does not apply to Material Suppliers, unless performing work on-site

† Applies only if Subcontractor is a DBE; only include these forms for the particular DBE Entity

Signed this _____ Day of _____, 20____ Under The Pains And Penalties Of Perjury.

(Print Name and Title)

(Authorized Signature)

PART 2

PART 2 SUBCONTRACTOR CERTIFICATION: I hereby certify, as an authorized official of this company, that the required documents in Part 1 above were physically incorporated in our Agreement/Subcontract with the Contractor and give assurance that this company will fully comply or make every good faith effort to comply with the same. I further certify that:

1. This company recognizes that if this is a Federal-Aid Project, then this Contract is covered by the equal employment opportunity laws administered and enforced by the United States Department of Labor ("USDOL"), Office of Federal Contract Compliance Programs ("OFCCP"). By signing below, we acknowledge that this company has certain reporting obligations to the OFCCP, as specified by 41 CFR Part 60-4.2.
2. This company further acknowledges that any contractor with fifty (50) or more employees on a Federal-aid Contract with a value of fifty-thousand (\$50,000) dollars or more must annually file an EEO-1 Report (SF 100) to the EEOC, Joint Reporting Committee, on or before September 30th, each year, as specified by 41 CFR Part 60-1.7a.
3. For more information regarding the federal reporting requirements, please contact the USDOL, OFCCP Regional Office, at 1-646-264-3170 or EEO-1, Joint Reporting Committee at 1-866-286-6440. You may also find guidance at: <http://www.dol.gov/ofccp/TAguides/consttag.pdf> or <http://www.wdol.gov/dba.aspx#0>.
4. This company ☐ has, ☐ has not, participated in a previous contract or subcontract subject to the Equal Opportunity clauses set forth in 41 CFR Part 60-4 and Executive Order 11246, and where required, has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance Programs or the EEO Commission all reports due under the applicable filing requirements.
5. This company is in full compliance with applicable Federal and Commonwealth of Massachusetts laws, rules, and regulations and is not currently debarred or disqualified from bidding on or participating in

construction contracts in any jurisdiction of the United States. See : <https://www.mass.gov/service-details/contractors-and-vendors-suspended-or-debarred-by-massdot>

6. This company is properly registered and in good standing with the Office of the Secretary of the Commonwealth.

Signed this _____ Day of _____, 20____, Under The Pains And Penalties Of Perjury.

Firm: _____

Address: _____

(Print Name and Title)

Telephone Number: _____

Federal I.D. Number: _____

Estimated Start Date: _____

Estimated Completion Date: _____

Estimated Dollar Amount: _____

(Authorized Signature)

(Date)

Rev'd 09/02/22

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DOCUMENT 00860

COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYMENT LAWS

Revised February 20, 2019

The Contractor's attention is directed to Massachusetts General Laws, Chapter 149, Sections 26 through 27H, and 150A. This contract is considered to fall within the ambit of that law, which provides that in general, the Prevailing Rate or Total Rate must be paid to employees working on projects funded by the Commonwealth of Massachusetts or any political subdivision including Massachusetts Department of Transportation (MassDOT).

A Federal Aid project is also subject to the Federal Minimum Wage Rate law for construction. When comparing a state minimum wage rate, monitored by the Massachusetts Attorney General, versus federal minimum wage rate, monitored by the U.S. Department of Labor Wage and Hour Division, for a particular job classification the higher wage is at all times to be paid to the affected employee.

Every contractor or subcontractor engaged in this contract to which sections twenty-seven and twenty-seven A apply will keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs and laborers employed thereon, showing the name, address and occupational classification of each such employee on this contract, and the hours worked by, and the wages paid to, each such employee, and shall furnish to the MassDOT's Resident Engineer, on a weekly basis, a copy of said record, in a form approved by MassDOT and in accordance with M.G.L. c. 149, § 27B, signed by the employer or his/her authorized agent under the penalties of perjury.

Each such contractor or subcontractor shall preserve its payroll records for a period of three years from the date of completion of the contract.

The Prevailing Wage Rate generally includes the following:

Minimum Hourly Wage + Employer Contributions to Benefit Plans = Prevailing Wage Rate or Total Rate

Any employer who does not make contributions to Benefit Plans must pay the total Prevailing Wage Rate directly to the employee.

Any deduction from the Prevailing Wage Rate or Total Rate for contributions to benefit plans can only be for a Health & Welfare, Pension, or Supplementary Unemployment plan meeting the requirements of the Employee Retirement Income Security Act (ERISA) of 1974. The maximum allowable deduction for these benefits from the prevailing wage rate cannot be greater than the amount allowed by Executive Office of Labor (EOL) for the specified benefits. Any additional expense of providing benefits to the employees is to be borne by the employer and cannot be deducted from the Minimum Hourly Wage. If the employer's benefit expense is less than that so provided by EOL the difference will be paid directly to the employee. The rate established must be paid to all employees who perform work on the project.

When an employer makes deductions from the Minimum Hourly Wage for an employee's contribution to social security, state taxes, federal taxes, and/or other contribution programs, allowed by law, the employer shall furnish each employee a suitable pay slip, check stub or envelope notifying the employee of the amount of the deductions.

No contractor or subcontractor contracting for any part of the contract week shall require or permit any laborer or mechanic to be employed on such work in excess of forty hours in any workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all hours worked in excess of forty hours in such workweek, whichever is the greater number of overtime hours.

Apprentice Rates are permitted only when there is an Apprentice Agreement registered with the Massachusetts Division of Apprentice Training in accordance with M.G.L. c. 23, § 11E-11L.

The Prevailing Wage Rates issued for each project shall be the rates paid for the entire project. The Prevailing Wage Rates must be posted on the job site at all times and be visible from a public way.

In addition, each such contractor and subcontractor shall furnish to the MassDOT's Resident Engineer, within fifteen days after completion of its portion of the work, a statement, executed by the contractor or subcontractor or by any authorized officer or employee of the contractor or subcontractor who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

Date:

I , _____ do hereby state: (Name of signatory party) (Title)

That I pay or supervise the payment of the persons employed by:

(Contractor or Subcontractor)

on the _____ (MassDOT Project Location and Contract Number)
and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty-nine of the General Laws.

Signature

Title

The above-mentioned copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to the MassDOT's Resident Engineer for such inspection and copying.

Massachusetts General Laws c. 149, §27, requires annual updates to prevailing wage schedules for all public construction contracts lasting longer than one year. MassDOT will request the required updates and furnish them to the Contractor. The Contractor is required to pay no less than the wage rates indicated on the annual updated wage schedules.

MassDOT will request the updates no later than two weeks before the anniversary of the Notice to Proceed date of the contract to allow for adequate processing by the Department of Labor Standards (DLS). The effective date for the new rates will be the anniversary date of the contract (i.e. the notice to proceed date), regardless of the date of issuance on the schedule from DLS.

All bidders are cautioned that the aforementioned laws require that employers pay to covered employees no less than the applicable minimum wages. In addition, the same laws require that the applicable prevailing wages become incorporated as part of this contract. The prevailing minimum wage law establishes serious civil and criminal penalties for violations, including imprisonment and exclusion from future public contracts. Bidders are cautioned to carefully read the relevant sections of the Massachusetts General Laws.

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DOCUMENT 00861

STATE PREVAILING WAGE RATES



MAURA HEALEY
Governor

KIM DRISCOLL
Lt. Governor

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the
Massachusetts General Laws, Chapter 149, Sections 26 to 27H

LAUREN JONES
Secretary

MICHAEL FLANAGAN
Director

Awarding Authority: MassDOT Rail and Transit
Contract Number: 128373 **City/Town:** DEERFIELD
Description of Work: Construction of four new Yard Tracks at the north end of East Deerfield Yard Intermodal Track area. East Deerfield Receiving Yard Tracks. Rehabilitation off existing turnouts, replacement turnouts
Job Location: East Deerfield, MA

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. For multi-year CM AT RISK projects, the awarding authority must request an annual update no later than two weeks before the anniversary date, determined as the earlier of: (a) the execution date of the GMP Amendment, or (b) the execution date of the first amendment to permit procurement of construction services. The updated wage schedule must be provided to all contractors, including general and sub-contractors, working on the construction project.
- This annual update requirement is generally not applicable to 27F "rental of equipment" contracts. For such contracts, the prevailing wage rates issued by DLS shall remain in effect for the duration of the contract term. However, if the prevailing wage rate sheet issued does not contain wage rates for each year covered by the contract term, the Awarding Authority must request updated rate sheets from DLS and provide them to the contractor to ensure the correct rates are being paid throughout the duration of the contract. Additionally, if an Awarding Authority exercises an option to renew or extend the contract term, they must request updated rate sheets from DLS and provide them to the contractor.
- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- An Awarding Authority must request an updated wage schedule if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule. For CM AT RISK projects (bid pursuant to G.L. c.149A), the earlier of: (a) the execution date of the GMP Amendment, or (b) the bid for the first construction scope of work must be within 90-days of the wage schedule issuance date.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. The wage schedule shall be made a part of the contract awarded for the project. The wage schedule must be posted in a conspicuous place at the work site for the life of the project in accordance with M.G.L. c. 149 § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project whether they are employed by the prime contractor, a filed sub-bidder, or a sub-contractor.
- Apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Standards (DAS). Apprentices must keep their apprentice identification card on their persons during all work hours on the project. An apprentice registered with DAS may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **Any apprentice not registered with DAS regardless of whether they are registered with another federal, state, local, or private agency must be paid the journeyworker's rate.**
- Every contractor or subcontractor working on the construction project must submit weekly payroll reports and a Statement of Compliance directly to the awarding authority by mail or email and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. For a sample payroll reporting form go to <http://www.mass.gov/dols/pw>.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Contractors must obtain the wage schedules from awarding authorities. Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may file a complaint with the Fair Labor Division of the office of the Attorney General at (617) 727-3465.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2024	\$39.95	\$15.07	\$18.67	\$0.00	\$73.69
	12/01/2024	\$39.95	\$15.07	\$20.17	\$0.00	\$75.19
	01/01/2025	\$39.95	\$15.57	\$20.17	\$0.00	\$75.69
	06/01/2025	\$40.95	\$15.57	\$20.17	\$0.00	\$76.69
	12/01/2025	\$40.95	\$15.57	\$21.78	\$0.00	\$78.30
	01/01/2026	\$40.95	\$16.17	\$21.78	\$0.00	\$78.90
	06/01/2026	\$41.95	\$16.17	\$21.78	\$0.00	\$79.90
	12/01/2026	\$41.95	\$16.17	\$23.52	\$0.00	\$81.64
	01/01/2027	\$41.95	\$16.77	\$23.52	\$0.00	\$82.24
(3 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2024	\$40.02	\$15.07	\$18.67	\$0.00	\$73.76
	12/01/2024	\$40.02	\$15.07	\$20.17	\$0.00	\$75.26
	01/01/2025	\$40.02	\$15.57	\$20.17	\$0.00	\$75.76
	06/01/2025	\$41.02	\$15.57	\$20.17	\$0.00	\$76.76
	12/01/2025	\$41.02	\$15.57	\$21.78	\$0.00	\$78.37
	01/01/2026	\$41.02	\$16.17	\$21.78	\$0.00	\$78.97
	06/01/2026	\$42.02	\$16.17	\$21.78	\$0.00	\$79.97
	12/01/2026	\$42.02	\$16.17	\$23.52	\$0.00	\$81.71
	01/01/2027	\$42.02	\$16.77	\$23.52	\$0.00	\$82.31
(4 & 5 AXLE) DRIVER - EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2024	\$40.14	\$15.07	\$18.67	\$0.00	\$73.88
	12/01/2024	\$40.14	\$15.07	\$20.17	\$0.00	\$75.38
	01/01/2025	\$40.14	\$15.57	\$20.17	\$0.00	\$75.88
	06/01/2025	\$41.14	\$15.57	\$20.17	\$0.00	\$76.88
	12/01/2025	\$41.14	\$15.57	\$21.78	\$0.00	\$78.49
	01/01/2026	\$41.14	\$16.17	\$21.78	\$0.00	\$79.09
	06/01/2026	\$42.14	\$16.17	\$21.78	\$0.00	\$80.09
	12/01/2026	\$42.14	\$16.17	\$23.52	\$0.00	\$81.83
	01/01/2027	\$42.14	\$16.77	\$23.52	\$0.00	\$82.43
ADS/SUBMERSIBLE PILOT <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
AIR TRACK OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$35.30	\$9.65	\$17.07	\$0.00	\$62.02
	12/02/2024	\$36.50	\$9.65	\$17.07	\$0.00	\$63.22
	06/02/2025	\$37.75	\$9.65	\$17.07	\$0.00	\$64.47
	12/01/2025	\$39.00	\$9.65	\$17.07	\$0.00	\$65.72
	06/01/2026	\$40.30	\$9.65	\$17.07	\$0.00	\$67.02
	12/07/2026	\$41.60	\$9.65	\$17.07	\$0.00	\$68.32
	06/07/2027	\$43.00	\$9.65	\$17.07	\$0.00	\$69.72
	12/06/2027	\$44.40	\$9.65	\$17.07	\$0.00	\$71.12
	06/05/2028	\$45.90	\$9.65	\$17.07	\$0.00	\$72.62
For apprentice rates see "Apprentice- LABORER"	12/04/2028	\$47.40	\$9.65	\$17.07	\$0.00	\$74.12

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
AIR TRACK OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$35.30	\$9.65	\$15.06	\$0.00	\$60.01
	12/01/2024	\$36.50	\$9.65	\$15.06	\$0.00	\$61.21
	06/01/2025	\$37.75	\$9.65	\$15.06	\$0.00	\$62.46
	12/01/2025	\$38.99	\$9.65	\$15.06	\$0.00	\$63.70
	06/01/2026	\$40.29	\$9.65	\$15.06	\$0.00	\$65.00
	12/01/2026	\$41.58	\$9.65	\$15.06	\$0.00	\$66.29
	For apprentice rates see "Apprentice- LABORER (Heavy and Highway)					
ASBESTOS WORKER (PIPES & TANKS) <i>HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)</i>	06/01/2024	\$37.62	\$14.50	\$10.55	\$0.00	\$62.67
	12/01/2024	\$38.52	\$14.50	\$10.55	\$0.00	\$63.57
	06/01/2025	\$39.42	\$14.50	\$10.55	\$0.00	\$64.47
	12/01/2025	\$40.32	\$14.50	\$10.55	\$0.00	\$65.37
ASPHALT RAKER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62
	For apprentice rates see "Apprentice- LABORER"					
ASPHALT RAKER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$34.80	\$9.65	\$15.06	\$0.00	\$59.51
	12/01/2024	\$36.00	\$9.65	\$15.06	\$0.00	\$60.71
	06/01/2025	\$37.25	\$9.65	\$15.06	\$0.00	\$61.96
	12/01/2025	\$38.49	\$9.65	\$15.06	\$0.00	\$63.20
	06/01/2026	\$39.79	\$9.65	\$15.06	\$0.00	\$64.50
	12/01/2026	\$41.08	\$9.65	\$15.06	\$0.00	\$65.79
	For apprentice rates see "Apprentice- LABORER (Heavy and Highway)					
AUTOMATIC GRADER-EXCAVATOR (RECLAIMER) <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2023	\$39.56	\$13.78	\$15.15	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2023	\$39.56	\$13.78	\$15.15	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BARCO-TYPE JUMPING TAMPER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62
	For apprentice rates see "Apprentice- LABORER"					

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BATCH/CEMENT PLANT - ON SITE <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2023	\$39.03	\$13.78	\$15.15	\$0.00	\$67.96
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BLOCK PAVER, RAMMER / CURB SETTER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$35.30	\$9.65	\$17.07	\$0.00	\$62.02
	12/02/2024	\$36.50	\$9.65	\$17.07	\$0.00	\$63.22
	06/02/2025	\$37.75	\$9.65	\$17.07	\$0.00	\$64.47
	12/01/2025	\$39.00	\$9.65	\$17.07	\$0.00	\$65.72
	06/01/2026	\$40.30	\$9.65	\$17.07	\$0.00	\$67.02
	12/07/2026	\$41.60	\$9.65	\$17.07	\$0.00	\$68.32
	06/07/2027	\$43.00	\$9.65	\$17.07	\$0.00	\$69.72
	12/06/2027	\$44.40	\$9.65	\$17.07	\$0.00	\$71.12
	06/05/2028	\$45.90	\$9.65	\$17.07	\$0.00	\$72.62
	12/04/2028	\$47.40	\$9.65	\$17.07	\$0.00	\$74.12
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$35.30	\$9.65	\$15.06	\$0.00	\$60.01
	12/01/2024	\$36.50	\$9.65	\$15.06	\$0.00	\$61.21
	06/01/2025	\$37.75	\$9.65	\$15.06	\$0.00	\$62.46
	12/01/2025	\$38.99	\$9.65	\$15.06	\$0.00	\$63.70
	06/01/2026	\$40.29	\$9.65	\$15.06	\$0.00	\$65.00
	12/01/2026	\$41.58	\$9.65	\$15.06	\$0.00	\$66.29
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
BOILER MAKER <i>BOILERMAKERS LOCAL 29</i>	01/01/2024	\$48.12	\$7.07	\$20.60	\$0.00	\$75.79

Apprentice - BOILERMAKER - Local 29

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
2	65	\$31.28	\$7.07	\$13.22	\$0.00	\$51.57
3	70	\$33.68	\$7.07	\$14.23	\$0.00	\$54.98
4	75	\$36.09	\$7.07	\$15.24	\$0.00	\$58.40
5	80	\$38.50	\$7.07	\$16.25	\$0.00	\$61.82
6	85	\$40.90	\$7.07	\$17.28	\$0.00	\$65.25
7	90	\$43.31	\$7.07	\$18.28	\$0.00	\$68.66
8	95	\$45.71	\$7.07	\$19.32	\$0.00	\$72.10

Notes:

Apprentice to Journeyworker Ratio:1:4

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) <i>BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)</i>	08/01/2024	\$52.06	\$11.49	\$21.46	\$0.00	\$85.01
	02/01/2025	\$53.36	\$11.49	\$21.46	\$0.00	\$86.31
	08/01/2025	\$55.51	\$11.49	\$21.46	\$0.00	\$88.46
	02/01/2026	\$56.86	\$11.49	\$21.46	\$0.00	\$89.81
	08/01/2026	\$59.06	\$11.49	\$21.46	\$0.00	\$92.01
	02/01/2027	\$60.46	\$11.49	\$21.46	\$0.00	\$93.41

Apprentice - BRICK/PLASTER/CEMENT MASON - Local 3 Springfield/Pittsfield

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.03	\$11.49	\$21.46	\$0.00	\$58.98
2	60	\$31.24	\$11.49	\$21.46	\$0.00	\$64.19
3	70	\$36.44	\$11.49	\$21.46	\$0.00	\$69.39
4	80	\$41.65	\$11.49	\$21.46	\$0.00	\$74.60
5	90	\$46.85	\$11.49	\$21.46	\$0.00	\$79.80

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$26.68	\$11.49	\$21.46	\$0.00	\$59.63
2	60	\$32.02	\$11.49	\$21.46	\$0.00	\$64.97
3	70	\$37.35	\$11.49	\$21.46	\$0.00	\$70.30
4	80	\$42.69	\$11.49	\$21.46	\$0.00	\$75.64
5	90	\$48.02	\$11.49	\$21.46	\$0.00	\$80.97

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/POWER SHOVEL/TREE SHREDDER /CLAM SHELL OPERATING	12/01/2023	\$39.56	\$13.78	\$15.15	\$0.00	\$68.49
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ENGINEERS LOCAL 98
For apprentice rates see "Apprentice- OPERATING ENGINEERS"

CAISSON & UNDERPINNING BOTTOM MAN LABORERS - FOUNDATION AND MARINE	06/01/2024	\$46.63	\$9.65	\$18.22	\$0.00	\$74.50
	12/01/2024	\$48.10	\$9.65	\$18.22	\$0.00	\$75.97
	06/01/2025	\$49.60	\$9.65	\$18.22	\$0.00	\$77.47
	12/01/2025	\$51.10	\$9.65	\$18.22	\$0.00	\$78.97
	06/01/2026	\$52.65	\$9.65	\$18.22	\$0.00	\$80.52
	12/01/2026	\$54.15	\$9.65	\$18.22	\$0.00	\$82.02

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING LABORER LABORERS - FOUNDATION AND MARINE	06/01/2024	\$45.48	\$9.65	\$18.22	\$0.00	\$73.35
	12/01/2024	\$46.95	\$9.65	\$18.22	\$0.00	\$74.82
	06/01/2025	\$48.45	\$9.65	\$18.22	\$0.00	\$76.32
	12/01/2025	\$49.95	\$9.65	\$18.22	\$0.00	\$77.82
	06/01/2026	\$51.50	\$9.65	\$18.22	\$0.00	\$79.37
	12/01/2026	\$53.00	\$9.65	\$18.22	\$0.00	\$80.87

For apprentice rates see "Apprentice- LABORER"

CAISSON & UNDERPINNING TOP MAN LABORERS - FOUNDATION AND MARINE	06/01/2024	\$45.81	\$9.65	\$18.22	\$0.00	\$73.68
	12/01/2024	\$47.28	\$9.65	\$18.22	\$0.00	\$75.15
	06/01/2025	\$48.78	\$9.65	\$18.22	\$0.00	\$76.65
	12/01/2025	\$50.28	\$9.65	\$18.22	\$0.00	\$78.15
	06/01/2026	\$51.83	\$9.65	\$18.22	\$0.00	\$79.70
	12/01/2026	\$53.33	\$9.65	\$18.22	\$0.00	\$81.20

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARBIDE CORE DRILL OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62

For apprentice rates see "Apprentice- LABORER"

CARPENTER <i>CARPENTERS LOCAL 336 - HAMPDEN HAMPSHIRE FRANKLIN</i>	09/01/2024	\$42.36	\$7.91	\$18.15	\$0.00	\$68.42
	03/01/2025	\$43.26	\$7.91	\$18.15	\$0.00	\$69.32
	09/01/2025	\$44.21	\$7.91	\$18.15	\$0.00	\$70.27
	03/01/2026	\$45.11	\$7.91	\$18.15	\$0.00	\$71.17
	09/01/2026	\$46.06	\$7.91	\$18.15	\$0.00	\$72.12
	03/01/2027	\$46.96	\$7.91	\$18.15	\$0.00	\$73.02

Apprentice - CARPENTER - Local 336 Hampden Hampshire Franklin

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$19.06	\$7.91	\$1.40	\$0.00	\$28.37
2	45	\$19.06	\$7.91	\$1.40	\$0.00	\$28.37
3	55	\$23.30	\$7.91	\$2.76	\$0.00	\$33.97
4	55	\$23.30	\$7.91	\$2.76	\$0.00	\$33.97
5	70	\$29.65	\$7.91	\$15.39	\$0.00	\$52.95
6	70	\$29.65	\$7.91	\$15.39	\$0.00	\$52.95
7	80	\$33.89	\$7.91	\$16.77	\$0.00	\$58.57
8	80	\$33.89	\$7.91	\$16.77	\$0.00	\$58.57

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$19.47	\$7.91	\$1.40	\$0.00	\$28.78
2	45	\$19.47	\$7.91	\$1.40	\$0.00	\$28.78
3	55	\$23.79	\$7.91	\$2.76	\$0.00	\$34.46
4	55	\$23.79	\$7.91	\$2.76	\$0.00	\$34.46
5	70	\$30.28	\$7.91	\$15.39	\$0.00	\$53.58
6	70	\$30.28	\$7.91	\$15.39	\$0.00	\$53.58
7	80	\$34.61	\$7.91	\$16.77	\$0.00	\$59.29
8	80	\$34.61	\$7.91	\$16.77	\$0.00	\$59.29

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CARPENTER WOOD FRAME	10/01/2024	\$26.65	\$7.02	\$4.80	\$0.00	\$38.47
CARPENTERS-ZONE 3 (Wood Frame)	10/01/2025	\$27.75	\$7.02	\$4.80	\$0.00	\$39.57
	10/01/2026	\$28.85	\$7.02	\$4.80	\$0.00	\$40.67
All Aspects of New Wood Frame Work						

Apprentice - CARPENTER (Wood Frame) - Zone 3

Effective Date - 10/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$15.99	\$7.02	\$0.00	\$0.00	\$23.01
2	60	\$15.99	\$7.02	\$0.00	\$0.00	\$23.01
3	65	\$17.32	\$7.02	\$1.00	\$0.00	\$25.34
4	70	\$18.66	\$7.02	\$1.00	\$0.00	\$26.68
5	75	\$19.99	\$7.02	\$4.80	\$0.00	\$31.81
6	80	\$21.32	\$7.02	\$4.80	\$0.00	\$33.14
7	85	\$22.65	\$7.02	\$4.80	\$0.00	\$34.47
8	90	\$23.99	\$7.02	\$4.80	\$0.00	\$35.81

Effective Date - 10/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$16.65	\$7.02	\$0.00	\$0.00	\$23.67
2	60	\$16.65	\$7.02	\$0.00	\$0.00	\$23.67
3	65	\$18.04	\$7.02	\$1.00	\$0.00	\$26.06
4	70	\$19.43	\$7.02	\$1.00	\$0.00	\$27.45
5	75	\$20.81	\$7.02	\$4.80	\$0.00	\$32.63
6	80	\$22.20	\$7.02	\$4.80	\$0.00	\$34.02
7	85	\$23.59	\$7.02	\$4.80	\$0.00	\$35.41
8	90	\$24.98	\$7.02	\$4.80	\$0.00	\$36.80

Notes:

% Indentured After 10/1/17; 45/45/55/55/70/70/80/80
Step 1&2 \$18.52/ 3&4 \$21.07/ 5&6 \$28.70/ 7&8 \$31.26

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING	01/01/2024	\$44.68	\$12.90	\$18.66	\$1.25	\$77.49
BRICKLAYERS LOCAL 3 (SPRINGFIELD/PITTSFIELD)						

Classification		Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - CEMENT MASONRY/PLASTERING - Springfield/Pittsfield							
Effective Date - 01/01/2024							
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$22.34	\$12.90	\$15.86	\$0.00	\$51.10	
2	60	\$26.81	\$12.90	\$18.66	\$1.25	\$59.62	
3	65	\$29.04	\$12.90	\$18.66	\$1.25	\$61.85	
4	70	\$31.28	\$12.90	\$18.66	\$1.25	\$64.09	
5	75	\$33.51	\$12.90	\$18.66	\$1.25	\$66.32	
6	80	\$35.74	\$12.90	\$18.66	\$1.25	\$68.55	
7	90	\$40.21	\$12.90	\$18.66	\$1.25	\$73.02	
Notes: Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.							
Apprentice to Journeyworker Ratio:1:3							
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CHAIN SAW OPERATOR		06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
LABORERS - ZONE 3 (BUILDING & SITE)		12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
		06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
		12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
		06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
		12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
		06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
		12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
		06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
		12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62
For apprentice rates see "Apprentice- LABORER"							
COMPRESSOR OPERATOR		12/01/2023	\$39.03	\$13.78	\$15.15	\$0.00	\$67.96
OPERATING ENGINEERS LOCAL 98							
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
CRANE OPERATOR		12/01/2023	\$43.06	\$13.78	\$15.15	\$0.00	\$71.99
OPERATING ENGINEERS LOCAL 98							
For apprentice rates see "Apprentice- OPERATING ENGINEERS"							
DELEADER (BRIDGE)		07/01/2024	\$57.26	\$9.95	\$23.95	\$0.00	\$91.16
PAINTERS LOCAL 35 - ZONE 3		01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$9.95	\$0.00	\$0.00	\$38.58
2	55	\$31.49	\$9.95	\$6.66	\$0.00	\$48.10
3	60	\$34.36	\$9.95	\$7.26	\$0.00	\$51.57
4	65	\$37.22	\$9.95	\$7.87	\$0.00	\$55.04
5	70	\$40.08	\$9.95	\$20.32	\$0.00	\$70.35
6	75	\$42.95	\$9.95	\$20.93	\$0.00	\$73.83
7	80	\$45.81	\$9.95	\$21.53	\$0.00	\$77.29
8	90	\$51.53	\$9.95	\$22.74	\$0.00	\$84.22

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.23	\$9.95	\$0.00	\$0.00	\$39.18
2	55	\$32.15	\$9.95	\$6.66	\$0.00	\$48.76
3	60	\$35.08	\$9.95	\$7.26	\$0.00	\$52.29
4	65	\$38.00	\$9.95	\$7.87	\$0.00	\$55.82
5	70	\$40.92	\$9.95	\$20.32	\$0.00	\$71.19
6	75	\$43.85	\$9.95	\$20.93	\$0.00	\$74.73
7	80	\$46.77	\$9.95	\$21.53	\$0.00	\$78.25
8	90	\$52.61	\$9.95	\$22.74	\$0.00	\$85.30

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN	06/10/2024	\$45.53	\$9.65	\$18.40	\$0.00	\$73.58
LABORERS - ZONE 3 (BUILDING & SITE)	12/02/2024	\$47.00	\$9.65	\$18.40	\$0.00	\$75.05
	06/02/2025	\$48.50	\$9.65	\$18.40	\$0.00	\$76.55
	12/01/2025	\$50.00	\$9.65	\$18.40	\$0.00	\$78.05
	06/01/2026	\$51.55	\$9.65	\$18.40	\$0.00	\$79.60
	12/07/2026	\$53.05	\$9.65	\$18.40	\$0.00	\$81.10
	06/07/2027	\$54.65	\$9.65	\$18.40	\$0.00	\$82.70
	12/06/2027	\$56.25	\$9.65	\$18.40	\$0.00	\$84.30
	06/05/2028	\$57.93	\$9.65	\$18.40	\$0.00	\$85.98
	12/04/2028	\$59.60	\$9.65	\$18.40	\$0.00	\$87.65

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: BACKHOE/LOADER/HAMMER OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/10/2024	\$46.53	\$9.65	\$18.40	\$0.00	\$74.58
	12/02/2024	\$48.00	\$9.65	\$18.40	\$0.00	\$76.05
	06/02/2025	\$49.50	\$9.65	\$18.40	\$0.00	\$77.55
	12/01/2025	\$51.00	\$9.65	\$18.40	\$0.00	\$79.05
	06/01/2026	\$52.55	\$9.65	\$18.40	\$0.00	\$80.60
	12/07/2026	\$54.05	\$9.65	\$18.40	\$0.00	\$82.10
	06/07/2027	\$55.65	\$9.65	\$18.40	\$0.00	\$83.70
	12/06/2027	\$57.25	\$9.65	\$18.40	\$0.00	\$85.30
	06/05/2028	\$58.93	\$9.65	\$18.40	\$0.00	\$86.98
	12/04/2028	\$60.60	\$9.65	\$18.40	\$0.00	\$88.65
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/10/2024	\$46.28	\$9.65	\$18.40	\$0.00	\$74.33
	12/02/2024	\$47.75	\$9.65	\$18.40	\$0.00	\$75.80
	06/02/2025	\$49.25	\$9.65	\$18.40	\$0.00	\$77.30
	12/01/2025	\$50.75	\$9.65	\$18.40	\$0.00	\$78.80
	06/01/2026	\$52.30	\$9.65	\$18.40	\$0.00	\$80.35
	12/07/2026	\$53.80	\$9.65	\$18.40	\$0.00	\$81.85
	06/07/2027	\$55.40	\$9.65	\$18.40	\$0.00	\$83.45
	12/06/2027	\$57.00	\$9.65	\$18.40	\$0.00	\$85.05
	06/05/2028	\$58.68	\$9.65	\$18.40	\$0.00	\$86.73
	12/04/2028	\$60.35	\$9.65	\$18.40	\$0.00	\$88.40
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/10/2024	\$46.53	\$9.65	\$18.40	\$0.00	\$74.58
	12/02/2024	\$48.00	\$9.65	\$18.40	\$0.00	\$76.05
	06/02/2025	\$49.50	\$9.65	\$18.40	\$0.00	\$77.55
	12/01/2025	\$51.00	\$9.65	\$18.40	\$0.00	\$79.05
	06/01/2026	\$52.55	\$9.65	\$18.40	\$0.00	\$80.60
	12/07/2026	\$54.05	\$9.65	\$18.40	\$0.00	\$82.10
	06/07/2027	\$55.65	\$9.65	\$18.40	\$0.00	\$83.70
	12/06/2027	\$57.25	\$9.65	\$18.40	\$0.00	\$85.30
	06/05/2028	\$58.93	\$9.65	\$18.40	\$0.00	\$86.98
	12/04/2028	\$60.60	\$9.65	\$18.40	\$0.00	\$88.65
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/10/2024	\$46.28	\$9.65	\$18.40	\$0.00	\$74.33
	12/02/2024	\$47.75	\$9.65	\$18.40	\$0.00	\$75.80
	06/02/2025	\$49.25	\$9.65	\$18.40	\$0.00	\$77.30
	12/01/2025	\$50.75	\$9.65	\$18.40	\$0.00	\$78.80
	06/01/2026	\$52.30	\$9.65	\$18.40	\$0.00	\$80.35
	12/07/2026	\$53.80	\$9.65	\$18.40	\$0.00	\$81.85
	06/07/2027	\$55.40	\$9.65	\$18.40	\$0.00	\$83.45
	12/06/2027	\$57.00	\$9.65	\$18.40	\$0.00	\$85.05
	06/05/2028	\$58.68	\$9.65	\$18.40	\$0.00	\$86.73
	12/04/2028	\$60.35	\$9.65	\$18.40	\$0.00	\$88.40
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DEMO: WRECKING LABORER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/10/2024	\$45.53	\$9.65	\$18.40	\$0.00	\$73.58
	12/02/2024	\$47.00	\$9.65	\$18.40	\$0.00	\$75.05
	06/02/2025	\$48.50	\$9.65	\$18.40	\$0.00	\$76.55
	12/01/2025	\$50.00	\$9.65	\$18.40	\$0.00	\$78.05
	06/01/2026	\$51.55	\$9.65	\$18.40	\$0.00	\$79.60
	12/07/2026	\$53.05	\$9.65	\$18.40	\$0.00	\$81.10
	06/07/2027	\$54.65	\$9.65	\$18.40	\$0.00	\$82.70
	12/06/2027	\$56.25	\$9.65	\$18.40	\$0.00	\$84.30
	06/05/2028	\$57.93	\$9.65	\$18.40	\$0.00	\$85.98
	12/04/2028	\$59.60	\$9.65	\$18.40	\$0.00	\$87.65
For apprentice rates see "Apprentice- LABORER"						
DIVER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$68.70	\$9.40	\$23.12	\$0.00	\$101.22
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$49.07	\$9.40	\$23.12	\$0.00	\$81.59
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER TENDER (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$73.60	\$9.40	\$23.12	\$0.00	\$106.12
For apprentice rates see "Apprentice- PILE DRIVER"						
DIVER/SLURRY (EFFLUENT) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$103.05	\$9.40	\$23.12	\$0.00	\$135.57
For apprentice rates see "Apprentice- PILE DRIVER"						
DRAWBRIDGE OPERATOR (Construction) <i>DRAWBRIDGE - SEIU LOCAL 888</i>	07/01/2020	\$26.77	\$6.67	\$3.93	\$0.16	\$37.53
ELECTRICIAN (Including Core Drilling) <i>ELECTRICIANS LOCAL 7</i>	06/30/2024	\$50.01	\$13.00	\$14.86	\$0.00	\$77.87
	12/29/2024	\$51.06	\$13.25	\$15.06	\$0.00	\$79.37
	06/29/2025	\$52.16	\$13.50	\$15.21	\$0.00	\$80.87
	12/28/2025	\$53.26	\$13.75	\$15.36	\$0.00	\$82.37
	06/28/2026	\$54.41	\$14.00	\$15.46	\$0.00	\$83.87
	01/03/2027	\$55.56	\$14.25	\$15.56	\$0.00	\$85.37

Apprentice - *ELECTRICIAN - Local 7*

Effective Date - 06/30/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.00	\$7.20	\$0.60	\$0.00	\$27.80
2	45	\$22.50	\$7.20	\$0.68	\$0.00	\$30.38
3	50	\$25.01	\$13.00	\$7.40	\$0.00	\$45.41
4	55	\$27.51	\$13.00	\$7.48	\$0.00	\$47.99
5	65	\$32.51	\$13.00	\$9.64	\$0.00	\$55.15
6	70	\$35.01	\$13.00	\$11.06	\$0.00	\$59.07

Effective Date - 12/29/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.42	\$7.35	\$0.61	\$0.00	\$28.38
2	45	\$22.98	\$7.35	\$0.69	\$0.00	\$31.02
3	50	\$25.53	\$13.25	\$7.47	\$0.00	\$46.25
4	55	\$28.08	\$13.25	\$7.54	\$0.00	\$48.87
5	65	\$33.19	\$13.25	\$9.74	\$0.00	\$56.18
6	70	\$35.74	\$13.25	\$11.19	\$0.00	\$60.18

Notes:

Steps 1-2 are 1000 hrs; Steps 3-6 are 1500 hrs.

Apprentice to Journeyworker Ratio:2:3****

ELEVATOR CONSTRUCTOR	01/01/2024	\$61.98	\$16.18	\$20.96	\$0.00	\$99.12
ELEVATOR CONSTRUCTORS LOCAL 41	01/01/2025	\$62.83	\$16.28	\$21.36	\$0.00	\$100.47
	01/01/2026	\$63.68	\$16.38	\$21.76	\$0.00	\$101.82
	01/01/2027	\$64.53	\$16.48	\$22.16	\$0.00	\$103.17

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
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Apprentice - ELEVATOR CONSTRUCTOR - Local 41

Effective Date - 01/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$30.99	\$16.18	\$0.00	\$0.00	\$47.17
2	55	\$34.09	\$16.18	\$20.96	\$0.00	\$71.23
3	65	\$40.29	\$16.18	\$20.96	\$0.00	\$77.43
4	70	\$43.39	\$16.18	\$20.96	\$0.00	\$80.53
5	80	\$49.58	\$16.18	\$20.96	\$0.00	\$86.72

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.42	\$16.28	\$0.00	\$0.00	\$47.70
2	55	\$34.56	\$16.28	\$21.36	\$0.00	\$72.20
3	65	\$40.84	\$16.28	\$21.36	\$0.00	\$78.48
4	70	\$43.98	\$16.28	\$21.36	\$0.00	\$81.62
5	80	\$50.26	\$16.28	\$21.36	\$0.00	\$87.90

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER	01/01/2024	\$43.39	\$16.18	\$20.96	\$0.00	\$80.53
ELEVATOR CONSTRUCTORS LOCAL 41	01/01/2025	\$43.98	\$16.28	\$21.36	\$0.00	\$81.62
	01/01/2026	\$44.58	\$16.38	\$21.76	\$0.00	\$82.72
	01/01/2027	\$45.17	\$16.48	\$22.16	\$0.00	\$83.81
For apprentice rates see "Apprentice - ELEVATOR CONSTRUCTOR"						
FENCE & GUARD RAIL ERECTOR (HEAVY & HIGHWAY)	06/01/2024	\$34.80	\$9.65	\$15.06	\$0.00	\$59.51
LABORERS - ZONE 3 (HEAVY & HIGHWAY)	12/01/2024	\$36.00	\$9.65	\$15.06	\$0.00	\$60.71
	06/01/2025	\$37.25	\$9.65	\$15.06	\$0.00	\$61.96
	12/01/2025	\$38.49	\$9.65	\$15.06	\$0.00	\$63.20
	06/01/2026	\$39.79	\$9.65	\$15.06	\$0.00	\$64.50
	12/01/2026	\$41.08	\$9.65	\$15.06	\$0.00	\$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FIELD ENG.INST/ROD-BLDG,SITE,HVY/HWY	06/01/1999	\$18.84	\$4.80	\$4.10	\$0.00	\$27.74
OPERATING ENGINEERS LOCAL 98						
FIELD ENG.PARTY CHIEF:BLDG,SITE,HVY/HWY	06/01/1999	\$21.33	\$4.80	\$4.10	\$0.00	\$30.23
OPERATING ENGINEERS LOCAL 98						
FIELD ENG.SURVEY CHIEF-BLDG,SITE,HVY/HWY	06/01/1999	\$22.33	\$4.80	\$4.10	\$0.00	\$31.23
OPERATING ENGINEERS LOCAL 98						
FIRE ALARM INSTALLER	06/30/2024	\$50.01	\$13.00	\$14.86	\$0.00	\$77.87
ELECTRICIANS LOCAL 7	12/29/2024	\$51.06	\$13.25	\$15.06	\$0.00	\$79.37
	06/29/2025	\$52.16	\$13.50	\$15.21	\$0.00	\$80.87
	12/28/2025	\$53.26	\$13.75	\$15.36	\$0.00	\$82.37
	06/28/2026	\$54.41	\$14.00	\$15.46	\$0.00	\$83.87
	01/03/2027	\$55.56	\$14.25	\$15.56	\$0.00	\$85.37
For apprentice rates see "Apprentice- ELECTRICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING <i>ELECTRICIANS</i> <i>LOCAL 7</i>	06/30/2024	\$50.01	\$13.00	\$14.86	\$0.00	\$77.87
	12/29/2024	\$51.06	\$13.25	\$15.06	\$0.00	\$79.37
	06/29/2025	\$52.16	\$13.50	\$15.21	\$0.00	\$80.87
	12/28/2025	\$53.26	\$13.75	\$15.36	\$0.00	\$82.37
	06/28/2026	\$54.41	\$14.00	\$15.46	\$0.00	\$83.87
	01/03/2027	\$55.56	\$14.25	\$15.56	\$0.00	\$85.37
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2023	\$39.03	\$13.78	\$15.15	\$0.00	\$67.96

Apprentice - OPERATING ENGINEERS - Local 98 Class 3

Effective Date - 12/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$23.42	\$13.78	\$15.15	\$0.00	\$52.35
2	70	\$27.32	\$13.78	\$15.15	\$0.00	\$56.25
3	80	\$31.22	\$13.78	\$15.15	\$0.00	\$60.15
4	90	\$35.13	\$13.78	\$15.15	\$0.00	\$64.06

Notes:

Steps 1-2 are 1000 hrs.; Steps 3-4 are 2000 hrs.

Apprentice to Journeyworker Ratio:1:6

FLAGGER & SIGNALER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$27.01	\$9.65	\$15.06	\$0.00	\$51.72
	12/01/2024	\$27.01	\$9.65	\$15.06	\$0.00	\$51.72
	06/01/2025	\$28.09	\$9.65	\$15.06	\$0.00	\$52.80
	12/01/2025	\$28.09	\$9.65	\$15.06	\$0.00	\$52.80
	06/01/2026	\$29.21	\$9.65	\$15.06	\$0.00	\$53.92
	12/01/2026	\$29.21	\$9.65	\$15.06	\$0.00	\$53.92
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
FLOORCOVERER <i>FLOORCOVERERS LOCAL 2168 ZONE III</i>	09/01/2024	\$42.36	\$7.91	\$18.15	\$0.00	\$68.42
	03/01/2025	\$43.26	\$7.91	\$18.15	\$0.00	\$69.32
	09/01/2025	\$44.21	\$7.91	\$18.15	\$0.00	\$70.27
	03/01/2026	\$45.11	\$7.91	\$18.15	\$0.00	\$71.17
	09/01/2026	\$46.06	\$7.91	\$18.15	\$0.00	\$72.12
	03/01/2027	\$46.96	\$7.91	\$18.15	\$0.00	\$73.02

Apprentice - FLOORCOVERER - Local 2168 Zone III

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.18	\$7.91	\$1.38	\$0.00	\$30.47
2	55	\$23.30	\$7.91	\$1.38	\$0.00	\$32.59
3	60	\$25.42	\$7.91	\$2.76	\$0.00	\$36.09
4	65	\$27.53	\$7.91	\$2.76	\$0.00	\$38.20
5	70	\$29.65	\$7.91	\$15.39	\$0.00	\$52.95
6	75	\$31.77	\$7.91	\$15.39	\$0.00	\$55.07
7	80	\$33.89	\$7.91	\$16.77	\$0.00	\$58.57
8	85	\$36.01	\$7.91	\$16.77	\$0.00	\$60.69

Effective Date - 03/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.63	\$7.91	\$1.38	\$0.00	\$30.92
2	55	\$23.79	\$7.91	\$1.38	\$0.00	\$33.08
3	60	\$25.96	\$7.91	\$2.76	\$0.00	\$36.63
4	65	\$28.12	\$7.91	\$2.76	\$0.00	\$38.79
5	70	\$30.28	\$7.91	\$15.39	\$0.00	\$53.58
6	75	\$32.45	\$7.91	\$15.39	\$0.00	\$55.75
7	80	\$34.61	\$7.91	\$16.77	\$0.00	\$59.29
8	85	\$36.77	\$7.91	\$16.77	\$0.00	\$61.45

Notes: Steps are 750 hrs.
% After 10/1/17; 45/45/55/55/70/70/80/80 (1500hr Steps)
Step 1&2 \$26.72.24/ 3&4 \$32.11/ 5&6 \$50.75/ 7&8 \$56.14

Apprentice to Journeyworker Ratio:1:1

FORK LIFT OPERATING ENGINEERS LOCAL 98 For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	\$39.25	\$13.78	\$15.15	\$0.00	\$68.18
GENERATORS/LIGHTING PLANTS OPERATING ENGINEERS LOCAL 98 For apprentice rates see "Apprentice- OPERATING ENGINEERS"	12/01/2023	\$35.80	\$13.78	\$15.15	\$0.00	\$64.73
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) GLAZIERS LOCAL 1333	06/01/2020	\$39.18	\$10.80	\$10.45	\$0.00	\$60.43

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - GLAZIER - Local 1333						
Effective Date - 06/01/2020						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.59	\$10.80	\$1.80	\$0.00	\$32.19
2	56	\$22.04	\$10.80	\$1.80	\$0.00	\$34.64
3	63	\$24.49	\$10.80	\$2.45	\$0.00	\$37.74
4	69	\$26.94	\$10.80	\$2.45	\$0.00	\$40.19
5	75	\$29.39	\$10.80	\$3.15	\$0.00	\$43.34
6	81	\$31.83	\$10.80	\$3.15	\$0.00	\$45.78
7	88	\$34.28	\$10.80	\$10.45	\$0.00	\$55.53
8	94	\$36.73	\$10.80	\$10.45	\$0.00	\$57.98
<div>Notes:</div>						
Apprentice to Journeyworker Ratio:1:3						
GRADER/TRENCHING MACHINE/DERRICK OPERATING ENGINEERS LOCAL 98	12/01/2023	\$39.56	\$13.78	\$15.15	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
HVAC (DUCTWORK) SHEETMETAL WORKERS LOCAL 63	07/01/2024	\$40.98	\$12.20	\$18.74	\$2.13	\$74.05
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) ELECTRICIANS LOCAL 7	06/30/2024	\$50.01	\$13.00	\$14.86	\$0.00	\$77.87
	12/29/2024	\$51.06	\$13.25	\$15.06	\$0.00	\$79.37
	06/29/2025	\$52.16	\$13.50	\$15.21	\$0.00	\$80.87
	12/28/2025	\$53.26	\$13.75	\$15.36	\$0.00	\$82.37
	06/28/2026	\$54.41	\$14.00	\$15.46	\$0.00	\$83.87
	01/03/2027	\$55.56	\$14.25	\$15.56	\$0.00	\$85.37
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) SHEETMETAL WORKERS LOCAL 63	07/01/2024	\$40.98	\$12.20	\$18.74	\$2.13	\$74.05
	01/01/2025	\$42.23	\$12.20	\$18.74	\$2.13	\$75.30
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING - WATER) PLUMBERS & PIPEFITTERS LOCAL 104	03/17/2024	\$49.21	\$9.55	\$17.10	\$0.00	\$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC PLUMBERS & PIPEFITTERS LOCAL 104	03/17/2024	\$49.21	\$9.55	\$17.10	\$0.00	\$75.86
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS (HEAVY & HIGHWAY) LABORERS - ZONE 3 (HEAVY & HIGHWAY)	06/01/2024	\$35.30	\$9.65	\$15.06	\$0.00	\$60.01
	12/01/2024	\$36.50	\$9.65	\$15.06	\$0.00	\$61.21
	06/01/2025	\$37.75	\$9.65	\$15.06	\$0.00	\$62.46
	12/01/2025	\$38.99	\$9.65	\$15.06	\$0.00	\$63.70
	06/01/2026	\$40.29	\$9.65	\$15.06	\$0.00	\$65.00
	12/01/2026	\$41.58	\$9.65	\$15.06	\$0.00	\$66.29
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
INSULATOR (PIPES & TANKS)	09/01/2024	\$45.54	\$14.75	\$19.61	\$0.00	\$79.90
HEAT & FROST INSULATORS LOCAL 6 (SPRINGFIELD)	09/01/2025	\$48.27	\$14.75	\$19.61	\$0.00	\$82.63
	09/01/2026	\$51.01	\$14.75	\$19.61	\$0.00	\$85.37

Apprentice - ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Springfield

Effective Date - 09/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.77	\$14.75	\$14.32	\$0.00	\$51.84
2	60	\$27.32	\$14.75	\$15.37	\$0.00	\$57.44
3	70	\$31.88	\$14.75	\$16.43	\$0.00	\$63.06
4	80	\$36.43	\$14.75	\$17.49	\$0.00	\$68.67

Effective Date - 09/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$24.14	\$14.75	\$14.32	\$0.00	\$53.21
2	60	\$28.96	\$14.75	\$15.37	\$0.00	\$59.08
3	70	\$33.79	\$14.75	\$16.43	\$0.00	\$64.97
4	80	\$38.62	\$14.75	\$17.49	\$0.00	\$70.86

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER	03/16/2024	\$40.66	\$8.25	\$22.70	\$0.00	\$71.61
IRONWORKERS LOCAL 7 (SPRINGFIELD AREA)						

Apprentice - IRONWORKER - Local 7 Springfield

Effective Date - 03/16/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$24.40	\$8.25	\$22.70	\$0.00	\$55.35
2	70	\$28.46	\$8.25	\$22.70	\$0.00	\$59.41
3	75	\$30.50	\$8.25	\$22.70	\$0.00	\$61.45
4	80	\$32.53	\$8.25	\$22.70	\$0.00	\$63.48
5	85	\$34.56	\$8.25	\$22.70	\$0.00	\$65.51
6	90	\$36.59	\$8.25	\$22.70	\$0.00	\$67.54

Notes:

Apprentice to Journeyworker Ratio:1:4

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
JACKHAMMER & PAVING BREAKER OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62

For apprentice rates see "Apprentice- LABORER"

LABORER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.55	\$9.65	\$17.07	\$0.00	\$61.27
	12/02/2024	\$35.75	\$9.65	\$17.07	\$0.00	\$62.47
	06/02/2025	\$37.00	\$9.65	\$17.07	\$0.00	\$63.72
	12/01/2025	\$38.25	\$9.65	\$17.07	\$0.00	\$64.97
	06/01/2026	\$39.55	\$9.65	\$17.07	\$0.00	\$66.27
	12/07/2026	\$40.85	\$9.65	\$17.07	\$0.00	\$67.57
	06/07/2027	\$42.25	\$9.65	\$17.07	\$0.00	\$68.97
	12/06/2027	\$43.65	\$9.65	\$17.07	\$0.00	\$70.37
	06/05/2028	\$45.15	\$9.65	\$17.07	\$0.00	\$71.87
	12/04/2028	\$46.65	\$9.65	\$17.07	\$0.00	\$73.37

Apprentice - *LABORER - Zone 3 Building & Site*

Effective Date - 06/03/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$20.73	\$9.65	\$17.07	\$0.00	\$47.45
2	70	\$24.19	\$9.65	\$17.07	\$0.00	\$50.91
3	80	\$27.64	\$9.65	\$17.07	\$0.00	\$54.36
4	90	\$31.10	\$9.65	\$17.07	\$0.00	\$57.82

Effective Date - 12/02/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.45	\$9.65	\$17.07	\$0.00	\$48.17
2	70	\$25.03	\$9.65	\$17.07	\$0.00	\$51.75
3	80	\$28.60	\$9.65	\$17.07	\$0.00	\$55.32
4	90	\$32.18	\$9.65	\$17.07	\$0.00	\$58.90

Notes:

Apprentice to Journeyworker Ratio:1:5

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$34.55	\$9.65	\$15.06	\$0.00	\$59.26
	12/01/2024	\$35.75	\$9.65	\$15.06	\$0.00	\$60.46
	06/01/2025	\$37.00	\$9.65	\$15.06	\$0.00	\$61.71
	12/01/2025	\$38.24	\$9.65	\$15.06	\$0.00	\$62.95
	06/01/2026	\$39.54	\$9.65	\$15.06	\$0.00	\$64.25
	12/01/2026	\$40.83	\$9.65	\$15.06	\$0.00	\$65.54

Apprentice - *LABORER (Heavy & Highway) - Zone 3*

Effective Date - 06/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$20.73	\$9.65	\$15.06	\$0.00	\$45.44
2	70	\$24.19	\$9.65	\$15.06	\$0.00	\$48.90
3	80	\$27.64	\$9.65	\$15.06	\$0.00	\$52.35
4	90	\$31.10	\$9.65	\$15.06	\$0.00	\$55.81

Effective Date - 12/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$21.45	\$9.65	\$15.06	\$0.00	\$46.16
2	70	\$25.03	\$9.65	\$15.06	\$0.00	\$49.74
3	80	\$28.60	\$9.65	\$15.06	\$0.00	\$53.31
4	90	\$32.18	\$9.65	\$15.06	\$0.00	\$56.89

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.55	\$9.65	\$17.07	\$0.00	\$61.27
	12/02/2024	\$35.75	\$9.65	\$17.07	\$0.00	\$62.47
	06/02/2025	\$37.00	\$9.65	\$17.07	\$0.00	\$63.72
	12/01/2025	\$38.25	\$9.65	\$17.07	\$0.00	\$64.97
	06/01/2026	\$39.55	\$9.65	\$17.07	\$0.00	\$66.27
	12/07/2026	\$40.85	\$9.65	\$17.07	\$0.00	\$67.57
	06/07/2027	\$42.25	\$9.65	\$17.07	\$0.00	\$68.97
	12/06/2027	\$43.65	\$9.65	\$17.07	\$0.00	\$70.37
	06/05/2028	\$45.15	\$9.65	\$17.07	\$0.00	\$71.87
	12/04/2028	\$46.65	\$9.65	\$17.07	\$0.00	\$73.37

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: CEMENT FINISHER TENDER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.55	\$9.65	\$17.07	\$0.00	\$61.27
	12/02/2024	\$35.75	\$9.65	\$17.07	\$0.00	\$62.47
	06/02/2025	\$37.00	\$9.65	\$17.07	\$0.00	\$63.72
	12/01/2025	\$38.25	\$9.65	\$17.07	\$0.00	\$64.97
	06/01/2026	\$39.55	\$9.65	\$17.07	\$0.00	\$66.27
	12/07/2026	\$40.85	\$9.65	\$17.07	\$0.00	\$67.57
	06/07/2027	\$42.25	\$9.65	\$17.07	\$0.00	\$68.97
	12/06/2027	\$43.65	\$9.65	\$17.07	\$0.00	\$70.37
	06/05/2028	\$45.15	\$9.65	\$17.07	\$0.00	\$71.87
	12/04/2028	\$46.65	\$9.65	\$17.07	\$0.00	\$73.37
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.47	\$9.65	\$17.20	\$0.00	\$61.32
	12/02/2024	\$35.67	\$9.65	\$17.20	\$0.00	\$62.52
	06/02/2025	\$36.92	\$9.65	\$17.20	\$0.00	\$63.77
	12/01/2025	\$38.17	\$9.65	\$17.20	\$0.00	\$65.02
	06/01/2026	\$39.47	\$9.65	\$17.20	\$0.00	\$66.32
	12/07/2026	\$40.77	\$9.65	\$17.20	\$0.00	\$67.62
	06/07/2027	\$42.17	\$9.65	\$17.20	\$0.00	\$69.02
	12/06/2027	\$43.57	\$9.65	\$17.20	\$0.00	\$70.42
	06/05/2028	\$45.07	\$9.65	\$17.20	\$0.00	\$71.92
	12/04/2028	\$46.57	\$9.65	\$17.20	\$0.00	\$73.42
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$37.55	\$9.65	\$17.07	\$0.00	\$64.27
	12/02/2024	\$38.75	\$9.65	\$17.07	\$0.00	\$65.47
	06/02/2025	\$40.00	\$9.65	\$17.07	\$0.00	\$66.72
	12/01/2025	\$41.25	\$9.65	\$17.07	\$0.00	\$67.97
	06/01/2026	\$42.55	\$9.65	\$17.07	\$0.00	\$69.27
	12/07/2026	\$43.85	\$9.65	\$17.07	\$0.00	\$70.57
	06/07/2027	\$45.25	\$9.65	\$17.07	\$0.00	\$71.97
	12/06/2027	\$46.65	\$9.65	\$17.07	\$0.00	\$73.37
	06/05/2028	\$48.15	\$9.65	\$17.07	\$0.00	\$74.87
	12/04/2028	\$49.65	\$9.65	\$17.07	\$0.00	\$76.37
For apprentice rates see "Apprentice- LABORER"						
LABORER: MASON TENDER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$34.80	\$9.65	\$15.06	\$0.00	\$59.51
	12/01/2024	\$36.00	\$9.65	\$15.06	\$0.00	\$60.71
	06/01/2025	\$37.25	\$9.65	\$15.06	\$0.00	\$61.96
	12/01/2025	\$38.49	\$9.65	\$15.06	\$0.00	\$63.20
	06/01/2026	\$39.79	\$9.65	\$15.06	\$0.00	\$64.50
	12/01/2026	\$41.08	\$9.65	\$15.06	\$0.00	\$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MULTI-TRADE TENDER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.55	\$9.65	\$17.07	\$0.00	\$61.27
	12/02/2024	\$35.75	\$9.65	\$17.07	\$0.00	\$62.47
	06/02/2025	\$37.00	\$9.65	\$17.07	\$0.00	\$63.72
	12/01/2025	\$38.25	\$9.65	\$17.07	\$0.00	\$64.97
	06/01/2026	\$39.55	\$9.65	\$17.07	\$0.00	\$66.27
	12/07/2026	\$40.85	\$9.65	\$17.07	\$0.00	\$67.57
	06/07/2027	\$42.25	\$9.65	\$17.07	\$0.00	\$68.97
	12/06/2027	\$43.65	\$9.65	\$17.07	\$0.00	\$70.37
	06/05/2028	\$45.15	\$9.65	\$17.07	\$0.00	\$71.87
	12/04/2028	\$46.65	\$9.65	\$17.07	\$0.00	\$73.37
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.55	\$9.65	\$17.07	\$0.00	\$61.27
	12/02/2024	\$35.75	\$9.65	\$17.07	\$0.00	\$62.47
	06/02/2025	\$37.00	\$9.65	\$17.07	\$0.00	\$63.72
	12/01/2025	\$38.25	\$9.65	\$17.07	\$0.00	\$64.97
	06/01/2026	\$39.55	\$9.65	\$17.07	\$0.00	\$66.27
	12/07/2026	\$40.85	\$9.65	\$17.07	\$0.00	\$67.57
	06/07/2027	\$42.25	\$9.65	\$17.07	\$0.00	\$68.97
	12/06/2027	\$43.65	\$9.65	\$17.07	\$0.00	\$70.37
	06/05/2028	\$45.15	\$9.65	\$17.07	\$0.00	\$71.87
	12/04/2028	\$46.65	\$9.65	\$17.07	\$0.00	\$73.37
This classification applies to the removal of standing trees, and the trimming and removal of branches and limbs when related to public works construction or site clearance incidental to construction . For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62
For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$34.80	\$9.65	\$15.06	\$0.00	\$59.51
	12/01/2024	\$36.00	\$9.65	\$15.06	\$0.00	\$60.71
	06/01/2025	\$37.25	\$9.65	\$15.06	\$0.00	\$61.96
	12/01/2025	\$38.49	\$9.65	\$15.06	\$0.00	\$63.20
	06/01/2026	\$39.79	\$9.65	\$15.06	\$0.00	\$64.50
	12/01/2026	\$41.08	\$9.65	\$15.06	\$0.00	\$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
MARBLE & TILE FINISHERS <i>BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE</i>	08/01/2024	\$43.05	\$11.49	\$20.53	\$0.00	\$75.07
	02/01/2025	\$44.90	\$11.49	\$20.53	\$0.00	\$76.92
	08/01/2025	\$45.81	\$11.49	\$20.53	\$0.00	\$77.83
	02/01/2026	\$46.89	\$11.49	\$20.53	\$0.00	\$78.91
	08/01/2026	\$48.65	\$11.49	\$20.53	\$0.00	\$80.67
	02/01/2027	\$49.77	\$11.49	\$20.53	\$0.00	\$81.79

Apprentice - MARBLE-TILE FINISHER-Local 3 Marble/Tile (Spr/Pitt)

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$21.53	\$11.49	\$20.53	\$0.00	\$53.55
2	60	\$25.83	\$11.49	\$20.53	\$0.00	\$57.85
3	70	\$30.14	\$11.49	\$20.53	\$0.00	\$62.16
4	80	\$34.44	\$11.49	\$20.53	\$0.00	\$66.46
5	90	\$38.75	\$11.49	\$20.53	\$0.00	\$70.77

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$22.45	\$11.49	\$20.53	\$0.00	\$54.47
2	60	\$26.94	\$11.49	\$20.53	\$0.00	\$58.96
3	70	\$31.43	\$11.49	\$20.53	\$0.00	\$63.45
4	80	\$35.92	\$11.49	\$20.53	\$0.00	\$67.94
5	90	\$40.41	\$11.49	\$20.53	\$0.00	\$72.43

Notes:

Apprentice to Journeyworker Ratio:1:5

MARBLE MASON/TILE LAYER(SP/PT)SeeBrick
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE

See "BRICK/STONE/ARTIFICIAL MASONRY(INCL.MASONRY WATERPROOFING)

MECH. SWEEPER OPERATOR (ON CONST. SITES) OPERATING ENGINEERS LOCAL 98	12/01/2023	\$39.56	\$13.78	\$15.15	\$0.00	\$68.49
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For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MECHANIC/WELDER/BOOM TRUCK OPERATING ENGINEERS LOCAL 98	12/01/2023	\$39.03	\$13.78	\$15.15	\$0.00	\$67.96
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For apprentice rates see "Apprentice- OPERATING ENGINEERS"

MILLWRIGHT (Zone 3) MILLWRIGHTS LOCAL 1121 - Zone 3	01/01/2024	\$41.20	\$10.08	\$21.22	\$0.00	\$72.50
	01/06/2025	\$43.48	\$10.08	\$21.22	\$0.00	\$74.78
	01/05/2026	\$45.76	\$10.08	\$21.22	\$0.00	\$77.06

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - MILLWRIGHT - Local 1121 Zone 3						
Effective Date - 01/01/2024						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$22.66	\$10.08	\$5.36	\$0.00	\$38.10
2	65	\$26.78	\$10.08	\$6.34	\$0.00	\$43.20
3	75	\$30.90	\$10.08	\$18.78	\$0.00	\$59.76
4	85	\$35.02	\$10.08	\$19.76	\$0.00	\$64.86
Effective Date - 01/06/2025						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	\$23.91	\$10.08	\$5.36	\$0.00	\$39.35
2	65	\$28.26	\$10.08	\$6.34	\$0.00	\$44.68
3	75	\$32.61	\$10.08	\$18.78	\$0.00	\$61.47
4	85	\$36.96	\$10.08	\$19.76	\$0.00	\$66.80
<div>Notes: Step 1&2 Appr. indentured after 1/6/2020 receive no pension, but do receive annuity. (Step 1 \$5.72, Step 2 \$6.66) Steps are 2,000 hours</div>						
Apprentice to Journeyworker Ratio:1:4						
MORTAR MIXER	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
LABORERS - ZONE 3 (BUILDING & SITE)	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62
For apprentice rates see "Apprentice- LABORER"						
OILER	12/01/2023	\$35.02	\$13.78	\$15.15	\$0.00	\$63.95
OPERATING ENGINEERS LOCAL 98						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS VI	12/01/2023	\$32.74	\$13.78	\$15.15	\$0.00	\$61.67
OPERATING ENGINEERS LOCAL 98						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS)	07/01/2024	\$57.26	\$9.95	\$23.95	\$0.00	\$91.16
PAINTERS LOCAL 35 - ZONE 3	01/01/2025	\$58.46	\$9.95	\$23.95	\$0.00	\$92.36

Apprentice - PAINTER Local 35 - BRIDGES/TANKS

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$28.63	\$9.95	\$0.00	\$0.00	\$38.58
2	55	\$31.49	\$9.95	\$6.66	\$0.00	\$48.10
3	60	\$34.36	\$9.95	\$7.26	\$0.00	\$51.57
4	65	\$37.22	\$9.95	\$7.87	\$0.00	\$55.04
5	70	\$40.08	\$9.95	\$20.32	\$0.00	\$70.35
6	75	\$42.95	\$9.95	\$20.93	\$0.00	\$73.83
7	80	\$45.81	\$9.95	\$21.53	\$0.00	\$77.29
8	90	\$51.53	\$9.95	\$22.74	\$0.00	\$84.22

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$29.23	\$9.95	\$0.00	\$0.00	\$39.18
2	55	\$32.15	\$9.95	\$6.66	\$0.00	\$48.76
3	60	\$35.08	\$9.95	\$7.26	\$0.00	\$52.29
4	65	\$38.00	\$9.95	\$7.87	\$0.00	\$55.82
5	70	\$40.92	\$9.95	\$20.32	\$0.00	\$71.19
6	75	\$43.85	\$9.95	\$20.93	\$0.00	\$74.73
7	80	\$46.77	\$9.95	\$21.53	\$0.00	\$78.25
8	90	\$52.61	\$9.95	\$22.74	\$0.00	\$85.30

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	07/01/2024	\$40.03	\$9.65	\$19.90	\$0.00	\$69.58
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.PAINTERS LOCAL 35 - ZONE 3	01/01/2025	\$41.23	\$9.65	\$19.90	\$0.00	\$70.78

Classification			Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - PAINTER Local 35 Zone 3 - Spray/Sandblast - New								
Effective Date -			07/01/2024					
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$20.02		\$9.95	\$0.00	\$0.00	\$29.97	
2	55	\$22.02		\$9.95	\$4.43	\$0.00	\$36.40	
3	60	\$24.02		\$9.95	\$4.83	\$0.00	\$38.80	
4	65	\$26.02		\$9.95	\$5.23	\$0.00	\$41.20	
5	70	\$28.02		\$9.95	\$17.49	\$0.00	\$55.46	
6	75	\$30.02		\$9.95	\$17.89	\$0.00	\$57.86	
7	80	\$32.02		\$9.95	\$18.29	\$0.00	\$60.26	
8	90	\$36.03		\$9.95	\$19.10	\$0.00	\$65.08	
Effective Date -			01/01/2025					
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$20.62		\$9.95	\$0.00	\$0.00	\$30.57	
2	55	\$22.68		\$9.95	\$4.43	\$0.00	\$37.06	
3	60	\$24.74		\$9.95	\$4.83	\$0.00	\$39.52	
4	65	\$26.80		\$9.95	\$5.23	\$0.00	\$41.98	
5	70	\$28.86		\$9.95	\$17.49	\$0.00	\$56.30	
6	75	\$30.92		\$9.95	\$17.89	\$0.00	\$58.76	
7	80	\$32.98		\$9.95	\$18.29	\$0.00	\$61.22	
8	90	\$37.11		\$9.95	\$19.10	\$0.00	\$66.16	
Notes:								
Steps are 750 hrs.								
Apprentice to Journeyworker Ratio:1:1								
PAINTER (SPRAY OR SANDBLAST, REPAINT)			07/01/2024	\$37.35	\$9.95	\$19.90	\$0.00	\$67.20
PAINTERS LOCAL 35 - ZONE 3			01/01/2025	\$38.55	\$9.95	\$19.90	\$0.00	\$68.40

Apprentice - PAINTER Local 35 Zone 3 - Spray/Sandblast - Repaint

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.68	\$9.95	\$0.00	\$0.00	\$28.63
2	55	\$20.54	\$9.95	\$4.43	\$0.00	\$34.92
3	60	\$22.41	\$9.95	\$4.83	\$0.00	\$37.19
4	65	\$24.28	\$9.95	\$5.23	\$0.00	\$39.46
5	70	\$26.15	\$9.95	\$17.49	\$0.00	\$53.59
6	75	\$28.01	\$9.95	\$17.89	\$0.00	\$55.85
7	80	\$29.88	\$9.95	\$18.29	\$0.00	\$58.12
8	90	\$33.62	\$9.95	\$19.10	\$0.00	\$62.67

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$19.28	\$9.95	\$0.00	\$0.00	\$29.23
2	55	\$21.20	\$9.95	\$4.43	\$0.00	\$35.58
3	60	\$23.13	\$9.95	\$4.83	\$0.00	\$37.91
4	65	\$25.06	\$9.95	\$5.23	\$0.00	\$40.24
5	70	\$26.99	\$9.95	\$17.49	\$0.00	\$54.43
6	75	\$28.91	\$9.95	\$17.89	\$0.00	\$56.75
7	80	\$30.84	\$9.95	\$18.29	\$0.00	\$59.08
8	90	\$34.70	\$9.95	\$19.10	\$0.00	\$63.75

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER / TAPER (BRUSH, NEW) *	07/01/2024	\$38.63	\$9.95	\$19.90	\$0.00	\$68.48
* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.PAINTERS LOCAL 35 - ZONE 3	01/01/2025	\$39.83	\$9.95	\$19.90	\$0.00	\$69.68

Classification			Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - PAINTER - Local 35 Zone 3 - BRUSH NEW								
Effective Date -			07/01/2024					
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$19.32		\$9.95	\$0.00	\$0.00	\$29.27	
2	55	\$21.25		\$9.95	\$4.43	\$0.00	\$35.63	
3	60	\$23.18		\$9.95	\$4.83	\$0.00	\$37.96	
4	65	\$25.11		\$9.95	\$5.23	\$0.00	\$40.29	
5	70	\$27.04		\$9.95	\$17.49	\$0.00	\$54.48	
6	75	\$28.97		\$9.95	\$17.89	\$0.00	\$56.81	
7	80	\$30.90		\$9.95	\$18.29	\$0.00	\$59.14	
8	90	\$34.77		\$9.95	\$19.10	\$0.00	\$63.82	
Effective Date -			01/01/2025					
Step	percent	Apprentice Base Wage		Health	Pension	Supplemental Unemployment	Total Rate	
1	50	\$19.92		\$9.95	\$0.00	\$0.00	\$29.87	
2	55	\$21.91		\$9.95	\$4.43	\$0.00	\$36.29	
3	60	\$23.90		\$9.95	\$4.83	\$0.00	\$38.68	
4	65	\$25.89		\$9.95	\$5.23	\$0.00	\$41.07	
5	70	\$27.88		\$9.95	\$17.49	\$0.00	\$55.32	
6	75	\$29.87		\$9.95	\$17.89	\$0.00	\$57.71	
7	80	\$31.86		\$9.95	\$18.29	\$0.00	\$60.10	
8	90	\$35.85		\$9.95	\$19.10	\$0.00	\$64.90	
Notes:								
Steps are 750 hrs.								
Apprentice to Journeyworker Ratio:1:1								
PAINTER / TAPER (BRUSH, REPAINT)			07/01/2024	\$35.95	\$9.95	\$19.90	\$0.00	\$65.80
PAINTERS LOCAL 35 - ZONE 3			01/01/2025	\$37.15	\$9.95	\$19.90	\$0.00	\$67.00

Apprentice - PAINTER Local 35 Zone 3 - BRUSH REPAINT

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$17.98	\$9.95	\$0.00	\$0.00	\$27.93
2	55	\$19.77	\$9.95	\$4.43	\$0.00	\$34.15
3	60	\$21.57	\$9.95	\$4.83	\$0.00	\$36.35
4	65	\$23.37	\$9.95	\$5.23	\$0.00	\$38.55
5	70	\$25.17	\$9.95	\$17.49	\$0.00	\$52.61
6	75	\$26.96	\$9.95	\$17.89	\$0.00	\$54.80
7	80	\$28.76	\$9.95	\$18.29	\$0.00	\$57.00
8	90	\$32.36	\$9.95	\$19.10	\$0.00	\$61.41

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$18.58	\$9.95	\$0.00	\$0.00	\$28.53
2	55	\$20.43	\$9.95	\$4.43	\$0.00	\$34.81
3	60	\$22.29	\$9.95	\$4.83	\$0.00	\$37.07
4	65	\$24.15	\$9.95	\$5.23	\$0.00	\$39.33
5	70	\$26.01	\$9.95	\$17.49	\$0.00	\$53.45
6	75	\$27.86	\$9.95	\$17.89	\$0.00	\$55.70
7	80	\$29.72	\$9.95	\$18.29	\$0.00	\$57.96
8	90	\$33.44	\$9.95	\$19.10	\$0.00	\$62.49

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER TRAFFIC MARKINGS (HEAVY/HIGHWAY) LABORERS - ZONE 3 (HEAVY & HIGHWAY)	06/01/2024	\$34.55	\$9.65	\$15.06	\$0.00	\$59.26
	12/01/2024	\$35.75	\$9.65	\$15.06	\$0.00	\$60.46
	06/01/2025	\$37.00	\$9.65	\$15.06	\$0.00	\$61.71
	12/01/2025	\$38.24	\$9.65	\$15.06	\$0.00	\$62.95
	06/01/2026	\$39.54	\$9.65	\$15.06	\$0.00	\$64.25
	12/01/2026	\$40.83	\$9.65	\$15.06	\$0.00	\$65.54
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PANEL & PICKUP TRUCKS DRIVER TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	06/01/2024	\$39.78	\$15.07	\$18.67	\$0.00	\$73.52
	12/01/2024	\$39.78	\$15.07	\$20.17	\$0.00	\$75.02
	01/01/2025	\$39.78	\$15.57	\$20.17	\$0.00	\$75.52
	06/01/2025	\$40.78	\$15.57	\$20.17	\$0.00	\$76.52
	12/01/2025	\$40.78	\$15.57	\$21.78	\$0.00	\$78.13
	01/01/2026	\$40.78	\$16.17	\$21.78	\$0.00	\$78.73
	06/01/2026	\$41.78	\$16.17	\$21.78	\$0.00	\$79.73
	12/01/2026	\$41.78	\$16.17	\$23.52	\$0.00	\$81.47
	01/01/2027	\$41.78	\$16.77	\$23.52	\$0.00	\$82.07

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) <i>PILE DRIVER LOCAL 56 (ZONE 3)</i> For apprentice rates see "Apprentice- PILE DRIVER"	08/01/2020	\$43.53	\$9.40	\$23.12	\$0.00	\$76.05
PILE DRIVER <i>PILE DRIVER LOCAL 56 (ZONE 3)</i>	08/01/2020	\$43.53	\$9.40	\$23.12	\$0.00	\$76.05

Apprentice - PILE DRIVER - Local 56 Zone 3

Effective Date - 08/01/2020

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Notes: Apprentice wages shall be no less than the following Steps;

(Same as set in Zone 1)

1\$57.06/2\$61.96/3\$66.87/4\$69.32/5\$71.78/6\$71.78/7\$76.68/8\$76.68

Apprentice to Journeyworker Ratio:1:5

PIPELAYER <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62

For apprentice rates see "Apprentice- LABORER"

PIPELAYER (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$34.80	\$9.65	\$15.06	\$0.00	\$59.51
	12/01/2024	\$36.00	\$9.65	\$15.06	\$0.00	\$60.71
	06/01/2025	\$37.25	\$9.65	\$15.06	\$0.00	\$61.96
	12/01/2025	\$38.49	\$9.65	\$15.06	\$0.00	\$63.20
	06/01/2026	\$39.79	\$9.65	\$15.06	\$0.00	\$64.50
	12/01/2026	\$41.08	\$9.65	\$15.06	\$0.00	\$65.79

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

PLUMBER & PIPEFITTER <i>PLUMBERS & PIPEFITTERS LOCAL 104</i>	03/17/2024	\$49.21	\$9.55	\$17.10	\$0.00	\$75.86
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Apprentice - PLUMBER/PIPEFITTER - Local 104
Effective Date - 03/17/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$22.14	\$9.55	\$10.10	\$0.00	\$41.79
2	50	\$24.61	\$9.55	\$10.10	\$0.00	\$44.26
3	55	\$27.07	\$9.55	\$10.10	\$0.00	\$46.72
4	60	\$29.53	\$9.55	\$10.10	\$0.00	\$49.18
5	65	\$31.99	\$9.55	\$10.10	\$0.00	\$51.64
6	70	\$34.45	\$9.55	\$10.10	\$0.00	\$54.10
7	75	\$36.91	\$9.55	\$10.10	\$0.00	\$56.56
8	80	\$39.37	\$9.55	\$10.10	\$0.00	\$59.02
9	80	\$39.37	\$9.55	\$17.10	\$0.00	\$66.02
10	80	\$39.37	\$9.55	\$17.10	\$0.00	\$66.02

Notes: **1:1,2:5,3:9,4:12

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) PLUMBERS & PIPEFITTERS LOCAL 104	03/17/2024	\$49.21	\$9.55	\$17.10	\$0.00	\$75.86
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For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"

PNEUMATIC DRILL/TOOL OPERATOR (HEAVY & HIGHWAY) LABORERS - ZONE 3 (HEAVY & HIGHWAY)	06/01/2024	\$34.80	\$9.65	\$15.06	\$0.00	\$59.51
	12/01/2024	\$36.00	\$9.65	\$15.06	\$0.00	\$60.71
	06/01/2025	\$37.25	\$9.65	\$15.06	\$0.00	\$61.96
	12/01/2025	\$38.49	\$9.65	\$15.06	\$0.00	\$63.20
	06/01/2026	\$39.79	\$9.65	\$15.06	\$0.00	\$64.50
	12/01/2026	\$41.08	\$9.65	\$15.06	\$0.00	\$65.79

For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"

POWDERMAN & BLASTER LABORERS - ZONE 3 (BUILDING & SITE)	06/03/2024	\$35.55	\$9.65	\$17.07	\$0.00	\$62.27
	12/02/2024	\$36.75	\$9.65	\$17.07	\$0.00	\$63.47
	06/02/2025	\$38.00	\$9.65	\$17.07	\$0.00	\$64.72
	12/01/2025	\$39.25	\$9.65	\$17.07	\$0.00	\$65.97
	06/01/2026	\$40.55	\$9.65	\$17.07	\$0.00	\$67.27
	12/07/2026	\$41.85	\$9.65	\$17.07	\$0.00	\$68.57
	06/07/2027	\$43.25	\$9.65	\$17.07	\$0.00	\$69.97
	12/06/2027	\$44.65	\$9.65	\$17.07	\$0.00	\$71.37
	06/05/2028	\$46.15	\$9.65	\$17.07	\$0.00	\$72.87
	12/04/2028	\$47.65	\$9.65	\$17.07	\$0.00	\$74.37

For apprentice rates see "Apprentice- LABORER"

POWDERMAN & BLASTER (HEAVY & HIGHWAY) LABORERS - ZONE 3 (HEAVY & HIGHWAY)	06/01/2024	\$35.55	\$9.65	\$15.06	\$0.00	\$60.26
	12/01/2024	\$36.75	\$9.65	\$15.06	\$0.00	\$61.46
	06/01/2025	\$38.00	\$9.65	\$15.06	\$0.00	\$62.71
	12/01/2025	\$39.24	\$9.65	\$15.06	\$0.00	\$63.95
	06/01/2026	\$40.54	\$9.65	\$15.06	\$0.00	\$65.25
	12/01/2026	\$41.83	\$9.65	\$15.06	\$0.00	\$66.54

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)						
PUMP OPERATOR (CONCRETE) <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2023	\$39.56	\$13.78	\$15.15	\$0.00	\$68.49
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2023	\$39.03	\$13.78	\$15.15	\$0.00	\$67.96
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER <i>TEAMSTERS 404 - Construction Service (Northampton)</i>	05/01/2024	\$26.14	\$11.82	\$7.25	\$0.00	\$45.21
RIDE-ON MOTORIZED BUGGY OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62
For apprentice rates see "Apprentice- LABORER"						
ROLLER OPERATOR <i>OPERATING ENGINEERS LOCAL 98</i>	12/01/2023	\$38.42	\$13.78	\$15.15	\$0.00	\$67.35
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Coal tar pitch) <i>ROOFERS LOCAL 248</i>	10/02/2024	\$42.38	\$10.35	\$18.00	\$0.00	\$70.73
	07/16/2025	\$43.88	\$10.35	\$18.00	\$0.00	\$72.23
	10/02/2025	\$44.88	\$10.35	\$18.00	\$0.00	\$73.23
	07/16/2026	\$46.88	\$10.35	\$18.00	\$0.00	\$75.23
For apprentice rates see "Apprentice- ROOFER"						
ROOFER (Inc.Roofing Waterproofing &Roofing Damproofg) <i>ROOFERS LOCAL 248</i>	10/02/2024	\$41.88	\$10.35	\$18.00	\$0.00	\$70.23
	07/16/2025	\$43.38	\$10.35	\$18.00	\$0.00	\$71.73
	10/02/2025	\$44.38	\$10.35	\$18.00	\$0.00	\$72.73
	07/16/2026	\$46.38	\$10.35	\$18.00	\$0.00	\$74.73

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Apprentice - ROOFER - Local 248						
Effective Date - 10/02/2024						
Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	\$25.13	\$10.35	\$0.00	\$0.00	\$35.48
2	65	\$27.22	\$10.35	\$18.00	\$0.00	\$55.57
3	70	\$29.32	\$10.35	\$18.00	\$0.00	\$57.67
4	75	\$31.41	\$10.35	\$18.00	\$0.00	\$59.76
5	80	\$33.50	\$10.35	\$18.00	\$0.00	\$61.85
6	85	\$35.60	\$10.35	\$18.00	\$0.00	\$63.95
7	90	\$37.69	\$10.35	\$18.00	\$0.00	\$66.04
8	95	\$39.79	\$10.35	\$18.00	\$0.00	\$68.14
Notes:						
Steps are 750 hrs.Roofer(Tear Off)1:1; Same as above						
Apprentice to Journeyworker Ratio:1:3						
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ROOFER SLATE / TILE / PRECAST CONCRETE	10/02/2024	\$42.38	\$10.35	\$18.00	\$0.00	\$70.73
ROOFERS LOCAL 248	07/16/2025	\$43.88	\$10.35	\$18.00	\$0.00	\$72.23
	10/02/2025	\$44.88	\$10.35	\$18.00	\$0.00	\$73.23
	07/16/2026	\$46.88	\$10.35	\$18.00	\$0.00	\$75.23
For apprentice rates see "Apprentice- ROOFER"						
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SCRAPER	12/01/2023	\$39.03	\$13.78	\$15.15	\$0.00	\$67.96
OPERATING ENGINEERS LOCAL 98						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
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SELF-POWERED ROLLERS AND COMPACTORS (TAMPERS)	12/01/2023	\$38.42	\$13.78	\$15.15	\$0.00	\$67.35
OPERATING ENGINEERS LOCAL 98						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
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SELF-PROPELLED POWER BROOM	12/01/2023	\$35.80	\$13.78	\$15.15	\$0.00	\$64.73
OPERATING ENGINEERS LOCAL 98						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
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SHEETMETAL WORKER	07/01/2024	\$40.98	\$12.20	\$18.74	\$2.13	\$74.05
SHEETMETAL WORKERS LOCAL 63	01/01/2025	\$42.23	\$12.20	\$18.74	\$2.13	\$75.30

Apprentice - SHEET METAL WORKER - Local 63

Effective Date - 07/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$18.44	\$5.49	\$4.86	\$0.85	\$29.64
2	50	\$20.49	\$6.10	\$5.40	\$0.94	\$32.93
3	55	\$22.54	\$6.71	\$9.71	\$1.15	\$40.11
4	60	\$24.59	\$7.32	\$9.71	\$1.23	\$42.85
5	65	\$26.64	\$7.93	\$9.71	\$1.31	\$45.59
6	70	\$28.69	\$8.54	\$9.71	\$1.39	\$48.33
7	75	\$30.74	\$9.15	\$9.71	\$1.47	\$51.07
8	80	\$32.78	\$9.76	\$17.66	\$1.78	\$61.98
9	85	\$34.83	\$10.37	\$17.66	\$1.86	\$64.72
10	90	\$36.88	\$10.98	\$17.66	\$1.94	\$67.46

Effective Date - 01/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$19.00	\$5.49	\$4.86	\$0.85	\$30.20
2	50	\$21.12	\$6.10	\$5.40	\$0.94	\$33.56
3	55	\$23.23	\$6.71	\$9.71	\$1.15	\$40.80
4	60	\$25.34	\$7.32	\$9.71	\$1.23	\$43.60
5	65	\$27.45	\$7.93	\$9.71	\$1.31	\$46.40
6	70	\$29.56	\$8.54	\$9.71	\$1.39	\$49.20
7	75	\$31.67	\$9.15	\$9.71	\$1.47	\$52.00
8	80	\$33.78	\$9.76	\$17.66	\$1.78	\$62.98
9	85	\$35.90	\$10.37	\$17.66	\$1.86	\$65.79
10	90	\$38.01	\$10.98	\$17.66	\$1.94	\$68.59

Notes:

Apprentice to Journeyworker Ratio:1:3

SPECIALIZED EARTH MOVING EQUIP < 35 TONS TEAMSTERS JOINT COUNCIL NO. 10 ZONE B	06/01/2024	\$40.24	\$15.07	\$18.67	\$0.00	\$73.98
	12/01/2024	\$40.24	\$15.07	\$20.17	\$0.00	\$75.48
	01/01/2025	\$40.24	\$15.57	\$20.17	\$0.00	\$75.98
	06/01/2025	\$41.24	\$15.57	\$20.17	\$0.00	\$76.98
	12/01/2025	\$41.24	\$15.57	\$21.78	\$0.00	\$78.59
	01/01/2026	\$41.24	\$16.17	\$21.78	\$0.00	\$79.19
	06/01/2026	\$42.24	\$16.17	\$21.78	\$0.00	\$80.19
	12/01/2026	\$42.24	\$16.17	\$23.52	\$0.00	\$81.93
	01/01/2027	\$42.24	\$16.77	\$23.52	\$0.00	\$82.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
SPECIALIZED EARTH MOVING EQUIP > 35 TONS <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2024	\$40.53	\$15.07	\$18.67	\$0.00	\$74.27
	12/01/2024	\$40.53	\$15.07	\$20.17	\$0.00	\$75.77
	01/01/2025	\$40.53	\$15.57	\$20.17	\$0.00	\$76.27
	06/01/2025	\$41.53	\$15.57	\$20.17	\$0.00	\$77.27
	12/01/2025	\$41.53	\$15.57	\$21.78	\$0.00	\$78.88
	01/01/2026	\$41.53	\$16.17	\$21.78	\$0.00	\$79.48
	06/01/2026	\$42.53	\$16.17	\$21.78	\$0.00	\$80.48
	12/01/2026	\$42.53	\$16.17	\$23.52	\$0.00	\$82.22
	01/01/2027	\$42.53	\$16.77	\$23.52	\$0.00	\$82.82
SPRINKLER FITTER <i>SPRINKLER FITTERS LOCAL 669</i>	04/01/2023	\$47.43	\$11.45	\$16.61	\$0.00	\$75.49

Apprentice - SPRINKLER FITTER - Local 669

Effective Date - 04/01/2023

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	45	\$21.34	\$8.22	\$0.00	\$0.00	\$29.56
2	50	\$23.72	\$8.22	\$0.00	\$0.00	\$31.94
3	55	\$26.09	\$11.45	\$7.20	\$0.00	\$44.74
4	60	\$28.46	\$11.45	\$8.35	\$0.00	\$48.26
5	65	\$30.83	\$11.45	\$8.35	\$0.00	\$50.63
6	70	\$33.20	\$11.45	\$8.60	\$0.00	\$53.25
7	75	\$35.57	\$11.45	\$8.60	\$0.00	\$55.62
8	80	\$37.94	\$11.45	\$8.60	\$0.00	\$57.99
9	85	\$40.32	\$11.45	\$8.60	\$0.00	\$60.37
10	90	\$42.69	\$11.45	\$8.60	\$0.00	\$62.74

Notes:

Apprentice to Journeyworker Ratio:1:1

TELECOMMUNICATION TECHNICIAN <i>ELECTRICIANS LOCAL 7</i>	06/30/2024	\$50.01	\$13.00	\$14.86	\$0.00	\$77.87
	12/29/2024	\$51.06	\$13.25	\$15.06	\$0.00	\$79.37
	06/29/2025	\$52.16	\$13.50	\$15.21	\$0.00	\$80.87
	12/28/2025	\$53.26	\$13.75	\$15.36	\$0.00	\$82.37
	06/28/2026	\$54.41	\$14.00	\$15.46	\$0.00	\$83.87
	01/03/2027	\$55.56	\$14.25	\$15.56	\$0.00	\$85.37

Apprentice - TELECOMMUNICATION TECHNICIAN - Local 7

Effective Date - 06/30/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.00	\$7.20	\$0.60	\$0.00	\$27.80
2	45	\$22.50	\$7.20	\$0.68	\$0.00	\$30.38
3	50	\$25.01	\$13.00	\$7.40	\$0.00	\$45.41
4	55	\$27.51	\$13.00	\$7.48	\$0.00	\$47.99
5	65	\$32.51	\$13.00	\$9.64	\$0.00	\$55.15
6	70	\$35.01	\$13.00	\$11.06	\$0.00	\$59.07

Effective Date - 12/29/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	\$20.42	\$7.35	\$0.61	\$0.00	\$28.38
2	45	\$22.98	\$7.35	\$0.69	\$0.00	\$31.02
3	50	\$25.53	\$13.25	\$7.47	\$0.00	\$46.25
4	55	\$28.08	\$13.25	\$7.54	\$0.00	\$48.87
5	65	\$33.19	\$13.25	\$9.74	\$0.00	\$56.18
6	70	\$35.74	\$13.25	\$11.19	\$0.00	\$60.18

Notes:

Steps are 800 hours

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS	08/01/2024	\$63.44	\$11.49	\$23.59	\$0.00	\$98.52
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE	02/01/2025	\$64.74	\$11.49	\$23.59	\$0.00	\$99.82
	08/01/2025	\$66.89	\$11.49	\$23.59	\$0.00	\$101.97
	02/10/2026	\$68.24	\$11.49	\$23.59	\$0.00	\$103.32
	08/01/2026	\$70.44	\$11.49	\$23.59	\$0.00	\$105.52
	02/01/2027	\$71.84	\$11.49	\$23.59	\$0.00	\$106.92

Apprentice - TERRAZZO FINISHER-Local 3 Marble/Tile (Spr/Ptt)

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$31.72	\$11.49	\$23.59	\$0.00	\$66.80
2	60	\$38.06	\$11.49	\$23.59	\$0.00	\$73.14
3	70	\$44.41	\$11.49	\$23.59	\$0.00	\$79.49
4	80	\$50.75	\$11.49	\$23.59	\$0.00	\$85.83
5	90	\$57.10	\$11.49	\$23.59	\$0.00	\$92.18

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.37	\$11.49	\$23.59	\$0.00	\$67.45
2	60	\$38.84	\$11.49	\$23.59	\$0.00	\$73.92
3	70	\$45.32	\$11.49	\$23.59	\$0.00	\$80.40
4	80	\$51.79	\$11.49	\$23.59	\$0.00	\$86.87
5	90	\$58.27	\$11.49	\$23.59	\$0.00	\$93.35

Notes:

Apprentice to Journeyworker Ratio:1:5

TERRAZZO MECHANIC	08/01/2024	\$64.52	\$11.49	\$23.56	\$0.00	\$99.57
BRICKLAYERS LOCAL 3 (SPR/PITT) - MARBLE & TILE	02/01/2025	\$65.82	\$11.49	\$23.56	\$0.00	\$100.87
	08/01/2025	\$67.97	\$11.49	\$23.56	\$0.00	\$103.02
	02/01/2026	\$69.32	\$11.49	\$23.56	\$0.00	\$104.37
	08/01/2026	\$71.52	\$11.49	\$23.56	\$0.00	\$106.57
	02/01/2027	\$72.92	\$11.49	\$23.56	\$0.00	\$107.97

Apprentice - TERRAZZO MECH - Local 3 Marble/Tile (Spr/Pitt)

Effective Date - 08/01/2024

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.26	\$11.49	\$23.56	\$0.00	\$67.31
2	60	\$38.71	\$11.49	\$23.56	\$0.00	\$73.76
3	70	\$45.16	\$11.49	\$23.56	\$0.00	\$80.21
4	80	\$51.62	\$11.49	\$23.56	\$0.00	\$86.67
5	90	\$58.07	\$11.49	\$23.56	\$0.00	\$93.12

Effective Date - 02/01/2025

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	\$32.91	\$11.49	\$23.56	\$0.00	\$67.96
2	60	\$39.49	\$11.49	\$23.56	\$0.00	\$74.54
3	70	\$46.07	\$11.49	\$23.56	\$0.00	\$81.12
4	80	\$52.66	\$11.49	\$23.56	\$0.00	\$87.71
5	90	\$59.24	\$11.49	\$23.56	\$0.00	\$94.29

Notes:

Apprentice to Journeyworker Ratio:1:5

TEST BORING DRILLER	06/01/2024	\$49.81	\$9.65	\$18.22	\$0.00	\$77.68
LABORERS - FOUNDATION AND MARINE	12/01/2024	\$51.28	\$9.65	\$18.22	\$0.00	\$79.15
	06/01/2025	\$52.78	\$9.65	\$18.22	\$0.00	\$80.65
	12/01/2025	\$54.28	\$9.65	\$18.22	\$0.00	\$82.15
	06/01/2026	\$55.83	\$9.65	\$18.22	\$0.00	\$83.70
	12/01/2026	\$57.33	\$9.65	\$18.22	\$0.00	\$85.20
For apprentice rates see "Apprentice- LABORER"						
TEST BORING DRILLER HELPER	06/01/2024	\$45.60	\$9.65	\$18.22	\$0.00	\$73.47
LABORERS - FOUNDATION AND MARINE	12/01/2024	\$47.07	\$9.65	\$18.22	\$0.00	\$74.94
	06/01/2025	\$48.57	\$9.65	\$18.22	\$0.00	\$76.44
	12/01/2025	\$50.07	\$9.65	\$18.22	\$0.00	\$77.94
	06/01/2026	\$51.62	\$9.65	\$18.22	\$0.00	\$79.49
	12/01/2026	\$53.12	\$9.65	\$18.22	\$0.00	\$80.99
For apprentice rates see "Apprentice- LABORER"						
TEST BORING LABORER	06/01/2024	\$45.48	\$9.65	\$18.22	\$0.00	\$73.35
LABORERS - FOUNDATION AND MARINE	12/01/2024	\$46.95	\$9.65	\$18.22	\$0.00	\$74.82
	06/01/2025	\$48.45	\$9.65	\$18.22	\$0.00	\$76.32
	12/01/2025	\$49.95	\$9.65	\$18.22	\$0.00	\$77.82
	06/01/2026	\$51.50	\$9.65	\$18.22	\$0.00	\$79.37
	12/01/2026	\$53.00	\$9.65	\$18.22	\$0.00	\$80.87
For apprentice rates see "Apprentice- LABORER"						
TRACTORS	12/01/2023	\$38.42	\$13.78	\$15.15	\$0.00	\$67.35
OPERATING ENGINEERS LOCAL 98						
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TRAILERS FOR EARTH MOVING EQUIPMENT <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2024	\$40.82	\$15.07	\$18.67	\$0.00	\$74.56
	12/01/2024	\$40.82	\$15.07	\$20.17	\$0.00	\$76.06
	01/01/2025	\$40.82	\$15.57	\$20.17	\$0.00	\$76.56
	06/01/2025	\$41.82	\$15.57	\$20.17	\$0.00	\$77.56
	12/01/2025	\$41.82	\$15.57	\$21.78	\$0.00	\$79.17
	01/01/2026	\$41.82	\$16.17	\$21.78	\$0.00	\$79.77
	06/01/2026	\$42.82	\$16.17	\$21.78	\$0.00	\$80.77
	12/01/2026	\$42.82	\$16.17	\$23.52	\$0.00	\$82.51
	01/01/2027	\$42.82	\$16.77	\$23.52	\$0.00	\$83.11
TUNNEL WORK - COMPRESSED AIR <i>LABORERS (COMPRESSED AIR)</i>	06/01/2024	\$57.71	\$9.65	\$19.00	\$0.00	\$86.36
	12/01/2024	\$59.18	\$9.65	\$19.00	\$0.00	\$87.83
	06/01/2025	\$60.68	\$9.65	\$19.00	\$0.00	\$89.33
	12/01/2025	\$62.18	\$9.65	\$19.00	\$0.00	\$90.83
	06/01/2026	\$63.73	\$9.65	\$19.00	\$0.00	\$92.38
	12/01/2026	\$65.23	\$9.65	\$19.00	\$0.00	\$93.88
	For apprentice rates see "Apprentice- LABORER"					
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) <i>LABORERS (COMPRESSED AIR)</i>	06/01/2024	\$59.71	\$9.65	\$19.00	\$0.00	\$88.36
	12/01/2024	\$61.18	\$9.65	\$19.00	\$0.00	\$89.83
	06/01/2025	\$62.68	\$9.65	\$19.00	\$0.00	\$91.33
	12/01/2025	\$64.18	\$9.65	\$19.00	\$0.00	\$92.83
	06/01/2026	\$65.73	\$9.65	\$19.00	\$0.00	\$94.38
	12/01/2026	\$67.23	\$9.65	\$19.00	\$0.00	\$95.88
	For apprentice rates see "Apprentice- LABORER"					
TUNNEL WORK - FREE AIR <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2024	\$49.78	\$9.65	\$19.00	\$0.00	\$78.43
	12/01/2024	\$51.25	\$9.65	\$19.00	\$0.00	\$79.90
	06/01/2025	\$52.75	\$9.65	\$19.00	\$0.00	\$81.40
	12/01/2025	\$54.25	\$9.65	\$19.00	\$0.00	\$82.90
	06/01/2026	\$55.80	\$9.65	\$19.00	\$0.00	\$84.45
	12/01/2026	\$57.30	\$9.65	\$19.00	\$0.00	\$85.95
	For apprentice rates see "Apprentice- LABORER"					
TUNNEL WORK - FREE AIR (HAZ. WASTE) <i>LABORERS (FREE AIR TUNNEL)</i>	06/01/2024	\$51.78	\$9.65	\$19.00	\$0.00	\$80.43
	12/01/2024	\$53.25	\$9.65	\$19.00	\$0.00	\$81.90
	06/01/2025	\$54.75	\$9.65	\$19.00	\$0.00	\$83.40
	12/01/2025	\$56.25	\$9.65	\$19.00	\$0.00	\$84.90
	06/01/2026	\$57.80	\$9.65	\$19.00	\$0.00	\$86.45
	12/01/2026	\$59.30	\$9.65	\$19.00	\$0.00	\$87.95
	For apprentice rates see "Apprentice- LABORER"					
VAC-HAUL <i>TEAMSTERS JOINT COUNCIL NO. 10 ZONE B</i>	06/01/2024	\$40.24	\$15.07	\$18.67	\$0.00	\$73.98
	12/01/2024	\$40.24	\$15.07	\$20.17	\$0.00	\$75.48
	01/01/2025	\$40.24	\$15.57	\$20.17	\$0.00	\$75.98
	06/01/2025	\$41.24	\$15.57	\$20.17	\$0.00	\$76.98
	12/01/2025	\$41.24	\$15.57	\$21.78	\$0.00	\$78.59
	01/01/2026	\$41.24	\$16.17	\$21.78	\$0.00	\$79.19
	06/01/2026	\$42.24	\$16.17	\$21.78	\$0.00	\$80.19
	12/01/2026	\$42.24	\$16.17	\$23.52	\$0.00	\$81.93
	01/01/2027	\$42.24	\$16.77	\$23.52	\$0.00	\$82.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
WAGON DRILL OPERATOR <i>LABORERS - ZONE 3 (BUILDING & SITE)</i>	06/03/2024	\$34.80	\$9.65	\$17.07	\$0.00	\$61.52
	12/02/2024	\$36.00	\$9.65	\$17.07	\$0.00	\$62.72
	06/02/2025	\$37.25	\$9.65	\$17.07	\$0.00	\$63.97
	12/01/2025	\$38.50	\$9.65	\$17.07	\$0.00	\$65.22
	06/01/2026	\$39.80	\$9.65	\$17.07	\$0.00	\$66.52
	12/07/2026	\$41.10	\$9.65	\$17.07	\$0.00	\$67.82
	06/07/2027	\$42.50	\$9.65	\$17.07	\$0.00	\$69.22
	12/06/2027	\$43.90	\$9.65	\$17.07	\$0.00	\$70.62
	06/05/2028	\$45.40	\$9.65	\$17.07	\$0.00	\$72.12
	12/04/2028	\$46.90	\$9.65	\$17.07	\$0.00	\$73.62
For apprentice rates see "Apprentice- LABORER"						
WAGON DRILL OPERATOR (HEAVY & HIGHWAY) <i>LABORERS - ZONE 3 (HEAVY & HIGHWAY)</i>	06/01/2024	\$34.80	\$9.65	\$15.06	\$0.00	\$59.51
	12/01/2024	\$36.00	\$9.65	\$15.06	\$0.00	\$60.71
	06/01/2025	\$37.25	\$9.65	\$15.06	\$0.00	\$61.96
	12/01/2025	\$38.49	\$9.65	\$15.06	\$0.00	\$63.20
	06/01/2026	\$39.79	\$9.65	\$15.06	\$0.00	\$64.50
	12/01/2026	\$41.08	\$9.65	\$15.06	\$0.00	\$65.79
For apprentice rates see "Apprentice- LABORER (Heavy and Highway)"						
WATER METER INSTALLER <i>PLUMBERS & PIPEFITTERS LOCAL 104</i>	03/17/2024	\$49.21	\$9.55	\$17.10	\$0.00	\$75.86
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours.)

Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof, unless otherwise specified.

** Multiple ratios are listed in the comment field.

*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.

**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

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STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT
SPECIFICATIONS

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted:
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.
 - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. "Minority" includes:
 - (i) Black (all persons having origins in any of the black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$ 10,000 the provisions of the specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in Paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc; by specific review of the policy with

all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables of affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as many be required by the Government and keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

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APPENDIX A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of \$ 10,000. The goals are applicable to the Contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract.

Area covered: Goal for Women apply nationwide

Goals and Timetables

Timetable

Goals (percent)

From Apr. 1, 1980 until further notice

6.9

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APPENDIX B-80

Until further notice, the following goals for minority utilization in each construction craft and trade shall included in all Federal or federally assisted construction contracts and subcontracts in excess of \$ 10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total on- site construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors participating in an approved Hometown Plan (see 41 CFR 6-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply with the applicable SMSA or EA goal contained in this Appendix B-80.

Economic AreasSTATE:Goals (percent)

MASSACHUSETTS

004 Boston MA:

SMSA Counties:

1123 Boston-Lowell-Brockton-Lawrence-Haverhill, MA-NH 4.0

MA Essex, MA Middlesex, MA Norfolk, MA Plymouth,

MA Suffolk, NH Rockingham.

5403 Fall River- New Bedford MA, Bristol 1.6

9243 Worcester-Fitchburg-Leominster, MA 1.6

6323 Springfield-Chicopee-Holyoke MA-CT 4.8

MA Hampden, MA Hampshire

Non-SMSA Counties: MA Barnstable, MA Dukes, MA Nantucket 3.6

Non-SMSA Counties: MA Franklin 5.9

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APPENDIX C

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.
3. **Solicitations for Subcontractors, including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor’s obligations under this contract and the Acts and the Regulations relative to nondiscrimination on the grounds of race, color, national origin (including limited English proficiency), age, sex, disability, or low-income status.
4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Massachusetts Department of Transportation (MassDOT) or FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor will so certify to MassDOT or FHWA, as appropriate, and will set forth what efforts it has made to obtain the information.
5. **Sanctions for Noncompliance:** In the event of a contractor’s noncompliance with the Nondiscrimination provisions of this contract, MassDOT will impose such contract sanctions as it or FHWA may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as MassDOT or FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request MassDOT to enter into any litigation to

protect the interests of MassDOT. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

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APPENDIX D

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor,” which includes consultants) agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

PERTINENT NON-DISCRIMINATION AUTHORITIES:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-Aid programs and projects)
- Federal-Aid Highway Act of 1973 (23 U.S.C. § 324 *et seq.*) (prohibits discrimination on the basis of sex)
- Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794 *et seq.*), as amended (prohibits discrimination on the basis of disability) and 49 CFR Part 27
- The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 *et seq.*) (prohibits discrimination on the basis of age)
- Airport and Airway Improvement Act of 1982 (49 U.S.C. § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex)
- The Civil Rights Restoration Act of 1987 (PL 100-209) (broadened the scope, coverage, and applicability of Title VI of the Civil Rights Act of 1964, the Age Discrimination Act of 1975, and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of Federal-Aid recipients, sub-recipients, and contractors, whether such programs or activities are Federally funded or not)
- Titles II and III of the Americans with Disabilities Act (42 U.S.C. §§ 12131-12189), as implemented by Department of Transportation regulations at 49 CFR parts 37 and 38 (prohibits discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities)
- The Federal Aviation Administration’s Non-Discrimination Statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations)
- Executive Order 13166, Improving Access to Services for People with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed.

- Reg. at 74087 to 74100)
- Title IX of the Education Amendments Act of 1972, as amended (20 U.S.C. 1681 *et seq.*) (prohibits discrimination on the basis of sex in education programs or activities)

*** END OF DOCUMENT ***

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DOCUMENT 00875

TRAINEE SPECIAL PROVISIONS

THE REQUIRED NUMBER OF TRAINEES TO BE TRAINED UNDER THIS CONTRACT WILL BE
1

The contractor shall provide on-the job training aimed at developing full journeyworkers in the type of trade of job classification involved.

In the event that a contractor subcontracts a portion of the contract work, the General Contractor shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeyworkers in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the Massachusetts Department Of Transportation (MassDOT) for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyworker status is a primary objective of the Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority and women trainees (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that have been taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training.

No employee shall be trained under this Special Provision in any classification in which he or she has successfully completed a training course leading to journeyworker status or in which he or she has been employed as a journeyworker. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the finding in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Massachusetts Department Of Transportation and the Federal Highway Administration. The Massachusetts Department Of Transportation and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyworker status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and

Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typist or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc. where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Federal Highway Administration division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Reimbursement

Under these Training Special Provisions, reimbursement will be as follows:

The Contractor will only be reimbursed 80 cents for each hour of on the job training as specified in the approved Training Program.

The Contractor is advised and encouraged that it may train additional persons in excess of the number specified and will be reimbursed as stated above. Reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement.

If less than full training specified in the approved training programs is provided, payment to the contractor will be made at a rate of 80 cents for each hour of training completed under this contract. However, no payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyworker, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision.

Payment

Trainees will be paid:

1. Percentage (%) of the journeyworker's rate as provided in the existing programs approved by the Department of Labor or Transportation as of September 15, 1970.
2. For journeyworker programs submitted by the Contractor and approved by Massachusetts Department Of Transportation and the Federal Highway Administration at least 60 percent of the appropriate minimum journeyworker's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period.
3. For skilled laborer programs, the minimum starting wage rate of unskilled laborer. At the conclusion of training, he or she will be paid the minimum wage rate of the Classification for programs submitted by the Contractor and approved by the Massachusetts Department Of Transportation and the Federal Highway Administration.
4. For the purposes of meeting the legal requirements of State Prevailing Wage Law, please be advised that no person may be paid the Apprentice wage rate as listed on a MA Prevailing Wage Rates

schedule, unless that person and program is registered with the Department of Labor Standards/Division of Apprentice Standards (DLS/DAS). Any person or program not registered with DLS/DAS, regardless of whether or not they are registered with any other federal, state, local, or private entity must be paid the journeyworker's rate for the trade.

The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Form FHWA-1409, Federal-aid Highway Construction Contracting Semi Annual Training Report, shall be submitted as per instructions on the Form.

*** END OF DOCUMENT ***

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DOCUMENT 00880

MINIMUM WAGES FOR FEDERAL AND FEDERALLY ASSISTED CONTRACTS

"General Decision Number: MA20240006 01/05/2024

Superseded General Decision Number: MA20230006

State: Massachusetts

Construction Type: Heavy Dredging

Counties: Massachusetts Statewide.
STATEWIDE

Massachusetts All Dredging, except self-propelled hopper dredges, on the Atlantic Coast & tributary waters emptying into the Atlantic Ocean.

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 14026 generally applies to the contract.. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 13658 generally applies to the contract.. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024

ENGI0025-001 10/01/2023

STATEWIDE

	Rates	Fringes
Dredging:		
CLASS A1.....	\$ 45.26	15.17+a+b
CLASS A2.....	\$ 40.33	14.82+a+b
CLASS B1.....	\$ 39.14	14.74+a+b
CLASS B2.....	\$ 36.84	14.58+a+b
CLASS C1.....	\$ 35.83	14.26+a+b
CLASS C2.....	\$ 34.68	14.18+a+b
CLASS D.....	\$ 28.81	13.77+a+b

CLASSIFICATIONS:

CLASS A1: Deck Captain; Mechanical Dredge Operator, Leverman, Licensed Tug Operator over 1000 HP.

CLASS A2: Crane Operator (360 swing).

CLASS B1: Derrick Operator (180 swing), Spider/Spill Barge Operator, Engineer, Electrician, Chief Welder, Chief Mate, Fill Placer, Operator II, Maintenance Engineer, Licensed Boat Operator, Licensed Crew Boat Operator.

CLASS B2: Certified Welder.

CLASS C1: Mate, Drag Barge Operator, Assistant Fill Placer, Welder, Steward.

CLASS C2: Boat Operator.

CLASS D: Oiler, Deckhand, Shoreman, Rodman, Scowman, Cook, Messman, Porter/Janitor.

INCENTIVE PAY: (Add to Hourly Rate)

Operator (NCCCO License/Certification) \$1.80 Licensed Tug Operator over 1000 HP (Assigned as Master) (USCG licensed Master of Towing Vessels (MOTV) \$1.80; Licensed Boat

Operator (Assigned as lead boat captain) USCG licensed boat operator \$1.30; Engineer (QMED and Tankerman endorsement or licensed engineer (USCG) \$1.80 Oiler (QMED and Tankerman endorsement (USCG) \$1.80; All classifications (Tankerman endorsement only) USCG \$1.55; Deckhand or Mate (AB with Lifeboatman endorsement (USCG) \$1.80; All classifications (lifeboatman endorsement only (USCG) \$1.55; Welder (ABS certification) \$1.55

FOOTNOTES APPLICABLE TO ABOVE CRAFTS:

- a. PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr.'s Birthday, Memorial Day, Good Friday, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day
- b. VACATION: Eight percent (8%) of the straight time rate, multiplied by the total hours worked.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an

interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

"General Decision Number: MA20240007 10/25/2024

Superseded General Decision Number: MA20230007

State: Massachusetts

Construction Type: Highway

County: Franklin County in Massachusetts.

HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 14026 generally applies to the contract.. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 13658 generally applies to the contract.. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the

Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/05/2024
1	01/19/2024
2	03/22/2024
3	05/31/2024
4	07/05/2024
5	09/06/2024
6	10/25/2024

* CARP0336-015 09/01/2024

	Rates	Fringes
CARPENTER.....	\$ 48.10	30.95

ENGI0098-006 06/01/2024

	Rates	Fringes
Power equipment operators:		
(1)		
Backhoe/Excavator/Trackhoe..	\$ 41.23	30.58+A
(1) Loader.....	\$ 41.23	30.58+A
(4) Roller.....	\$ 37.47	30.58+A
Crane.....	\$ 44.73	30.58+A

A. Paid Holidays: New year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day

IRON0007-025 03/16/2024

	Rates	Fringes
IRONWORKER (REINFORCING AND STRUCTURAL).....	\$ 39.51	32.98

LABO0596-002 12/01/2021

	Rates	Fringes
LABORER		
Asphalt, Includes Raker, Shoveler, Spreader, and Distributor.....	\$ 32.75	23.96
Common or General.....	\$ 32.50	23.96
Guardrail Installation.....	\$ 32.75	23.96
Landscape.....	\$ 32.50	23.96

SUMA2014-003 01/11/2017

	Rates	Fringes
PAINTER: Spray (Linestriping)....	\$ 38.85	0.00

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

State Adopted Rate Identifiers

Classifications listed under the "SA" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R. §1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 01/03/2024 reflects the date on which the classifications and rates under the "SA" identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

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DOCUMENT A00801

SPECIAL PROVISIONS

FY 2025 CAPITAL IMPROVEMENT PROGRAM

EAST DEERFIELD YARD INTERMODAL PROJECT

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PROJECT NOTES

GENERAL

- A. Labor participation goals for this Project shall be 15.3% for minorities and 6.9% for women for each job category. The goals are applicable to both Contractor's and Subcontractor's on-site construction workforce. Refer to Document 00820 for details.**

B. PROJECT DESCRIPTION

East Deerfield Yard, located in East Deerfield, MA, is owned by the Commonwealth of Massachusetts (Massachusetts Department of Transportation - MassDOT), and is operated, inspected and maintained by the Pan Am Southern, LLC ("Railroad") under contract.

The Project work consists of existing yard track removal; excavation and wasting of excavated material; preparing track and roadway subgrade; installation of new No. 10 Turnouts and new No. 8 Turnouts and construction of four (4) new Yard Tracks at the north end of East Deerfield Yard Intermodal Track area; installation of four (4) wheel stops; installation of one (1) Sliding Block Derail and four (4) Hinged Block Derails; and construction of rubber rail seal/asphalt crossings, construction of rubber rail seal/ballast crossing, and aggregate access roads at the north end of East Deerfield Yard. Receiving Yard Track improvements include rehabilitation of existing No. 10 Turnouts, replacement of No. 10 turnouts, and rehabilitation of four (4) existing Receiving Tracks.

Materials will be supplied as specified in the Special Provisions. The project includes, but is not limited to, the following work items:

- Excavating and wasting up to 2,300 CY of excavated material. Excavated material to remain on railroad right-of-way (R-o-W) and wasted to level low spots in the yard or otherwise wasted along the Springfield Terminal Railways R-o-W as directed by the Engineer.
- Removal of up to 660 Track Feet (TF) for the intermodal site and 2,735 TF for the receiving yard tracks for a total of 3,395 Track Feet (TF) of existing jointed track on timber ties. For the receiving yard tracks removal consists of existing rail, OTM and ties marked for replacement by the Engineer and as-directed. Rail and OTM removed from the Receiving yard tracks will be stored at a location determined by MassDOT within 10-miles of the East Deerfield Yard project.
- Furnishing and installing up to 500 Tons of new stone subballast for new track construction.
- Furnishing and installing up to 4,000 Tons for the intermodal site and 10,000 Tons in the receiving yard tracks for a total of 14,000 Tons of new stone ballast to be used for bottom ballast and to line, surface, and tamp new track and turnouts.
- Construction of up to 2,041 TF of new 136RE jointed rail on timber tie ballasted track for the intermodal site. New track construction includes placement of bottom ballast, placement of new 7" x 9" x 8'-6" timber crossties, installing new 136RE jointed rail using tie plates with cut spikes and anchors, and flooding track with new ballast. All track material to be supplied by MassDOT. Ballast to be supplied by Contractor.
- Installation of a new No. 10 Left-hand (LH) turnout on the North Tower Track at NTT Sta.22+46. Installation of four (4) new No. 10 turnout on the Receiving Tracks. Installation of a new No. 8 Left-hand (LH) turnout on the North Tower Track at NTT Sta.23+63. Installation of a new No. 8 Left-hand (LH) turnout on the Farm Bureau 1 Track at FB1 Sta.30+98.

Installation of a new No. 8 Right-hand (RH) turnout on the Chucky Track at CT Sta.51+31. Turnouts will be supplied by MassDOT. Ballast to be supplied by Contractor.

- Rehabilitation of one (1) existing No.10 Left-hand (LH) turnout on the North Tower Track at NTT Sta.19+97. All track material to be supplied by MassDOT. Ballast to be supplied by Contractor.
- Rehabilitation of five (5) existing No.10 turnouts on the Receiving Tracks. All track material to be supplied by MassDOT. Ballast to be supplied by Contractor.
- Rehabilitation of four (4) existing Receiving Tracks, total length is 17,250 TF. All track material to be supplied by MassDOT. Ballast to be supplied by Contractor. 1,000 new ties for each track will be provided by MassDOT.
- Line, surface and tamp up to 3,299TF on the intermodal track and 18,735TF on the receiving yard track for a total of 22,034TF of track and turnouts. Line, surface and tamping quantity based on a single pass of the tamper. This includes new trackwork, turnouts to be rehabbed, track to be rehabbed, and raising existing track profiles to meet new trackwork. In tamping turnouts, the total TF tamped includes a pass through both the straight move and through the diverging move.
- Furnishing and installing up to 2,400 Tons of M2.01.7 Dense Graded Crushed Stone for access roads. Furnishing and installing up to 366 TF of Rubber Rail Seal and hot mix asphalt (HMA) pavement for yard track crossings. Furnishing and installing up to 347 TF of Rubber Rail Seal and ballast for the Farm Bureau 1 Track. Up to 150 Tons of HMA is intended for use on the intermodal site project.
- Disposal of up to 650 Tons of scrap crossties and switch timbers from the project limits and from the Railroad Right-of-Way. All removed ties and timbers are to be taken to an approved disposal site, licensed for processing of creosote-treated railroad ties, to be disposed of in accordance with EPA requirements.
- Furnishing, assembly and installation of one (1) Sliding Block Derail and four (4) Hinged Block Derails. Derails to be supplied by the Contractor.
- Furnish and Installation of four (4) Wheel Stops. Wheel Stops to be supplied by Contractor.

The East Deerfield Yard Operations consist of the following:

- Pan Am Southern, LLC ("Railroad") freight and equipment moves in East Deerfield Yard and adjacent mainline tracks.

MassDOT Rail requires for this project that the construction be sequenced so that the receiving yard work be completed prior to commencement of the intermodal yard work. This is due to yard operations and the staging of equipment for mainline activities on the adjacent Connecticut River Main Line tracks and Freight Mainline tracks.

Contractor shall submit a Construction Schedule, and Work Sequencing Plan to Owner for review and approval before commencing work.

C. SCOPE OF WORK

The Scope of Work to be performed in East Deerfield Yard consists of: assembly, installation and safeguard five (5) MBTA No. 10 Turnouts and three (3) MBTA No. 8 Turnouts and associated other

track materials; rehabilitate six (6) No.10 Turnouts; dismantle and stockpile existing track materials; construct new yard tracks; rehabilitate existing yard tracks, install ballast, subballast and surface and align track; furnish and install rubber rail seal crossings; furnish, install and compact hot mix asphalt and ballast for crossings; furnish, install and compact gravel borrow for access roads; furnish and install one (1) Sliding Block Derail and four (4) Hinged Block Derails; furnish and install four (4) wheel stops; and storage and dispose of removed materials as directed in these bid documents. This list has been compiled to provide Contractor with an order of magnitude work scope and to attempt to describe the complexity of the work required. Contractor is advised that it is the sole responsibility of Contractor to perform all the work in conformance with the Contract Documents and to satisfactorily complete the work on time and to the standards of MassDOT Rail and Transit Division (MassDOT or Owner) and Pan Am Southern, LLC ("Railroad").

MassDOT Rail requires for this project that the construction be sequenced so that the receiving yard work be completed prior to commencement of the intermodal yard work. This is due to yard operations and the staging of equipment for mainline activities on the adjacent Connecticut River Main Line tracks and Freight Mainline tracks.

1. Pre-construction Coordination, Permitting and Engineering

A. Utilities

1. Contractor is responsible for locating, protecting and preserving all existing utilities, conduits, cabling, crossing signals and structures, known and unknown, within the work limits and construction work areas.
2. Contractor is responsible for coordination with Railroad and utility owner(s) of any utility encountered prior to, or during, construction.
3. Contractor is responsible for coordination with the operating Railroad(s) for the protection of any railroad crossing signal systems and proper pre-construction train traffic signaling requirements.

B. Survey and As-Builts

1. For the Intermodal Yard work, the Contractor is responsible for performing a pre-construction site survey to confirm existing ground topography, and horizontal and vertical alignment of the existing track structure. The survey must include the existing top of rail elevations, existing track alignment bearing and verification of dimensions and material types.
2. For the Receiving Yard work, the Contractor is responsible for performing a pre-construction site visit to confirm existing track conditions and quantities. Following completion of the project the Contractor will produce survey verifying rail horizontal and vertical alignments and track center spacing for review by MassDOT.
3. Contractor shall establish pre-construction survey control throughout the construction work limits and submit to MassDOT/Pan Am Southern, LLC for review and approval prior to construction. Contractor shall field verify critical existing grades, track alignments and physical obstacle locations as shown and not shown on the Contract Plans.

4. Contractor shall submit post-construction, hard copy and CAD, as-built plans to MassDOT/Pan Am Southern, LLC upon completion of the project. The as-built plans shall include, at a minimum, final track line and grade; horizontal and vertical track geometry data tables, special trackwork geometry data, drainage location and means; concrete segmental wall construction details and all other pertinent information.
5. All Work performed in this section shall be in accordance with this Scope of Work, Contract Plans, Special Provisions and all State and local requirements.

2. Site Preparation

A. Excavation and Disposal of Excavated Material

1. The excavation depth for the new or realigned track areas shall be at bottom of existing tie per the proposed alignment and profile shown on the Contract Plans. Excavation limits are shown on the Contract Plans. During construction, any subgrade areas found to be inadequate will be excavated and replaced with full depth subballast and ballast at the direction of the Engineer.
2. Excavated material is to be spread, graded, and compacted within the immediate yard area outside of newly installed track and switch limits to fill holes with the goal of creating an even walking surface and roadways, adjacent to and level with the top of crossties. All areas adjacent to tracks should be left smoothly graded. Excavated material may be used to create berms and landscape features within the limits of the yard at the direction of MassDOT/Pan Am Southern, LLC. The remainder of the excavated materials is to remain within, and be dumped and graded along, the MassDOT Right-of-Way within five (5) miles of the work site at locations designated by MassDOT/Pan Am Southern, LLC.
3. If found, below grade construction, including foundation walls, signal foundations, footings, etc. will be demolished in accordance with the Technical Specification, AREMA Standards and as directed by Railroad and shall be considered incidental to the excavation item.

B. Preparation of Subgrade and Trackbed Installation

1. Trackbed subgrade includes between lines ten feet (10') outside of the proposed track centerlines in both directions to a depth of twenty-seven inches (27") below the proposed top of rail final grade and other areas shown on the Contract Plans.
2. The excavated subgrade area for the turnout locations and yard tracks shall be thoroughly compacted per the Special Provisions before installation of any ballast section.
3. A minimum depth of six (6) inches of new compacted bottom ballast shall be placed, graded and compacted throughout the excavated areas before the new turnouts and yard tracks are installed.
4. In the areas where existing track must be thrown and/or re-aligned, the shoulder/roadbed adjacent to the crossties shall be properly excavated, and ballast added and compacted as necessary to accommodate the track throw/re-alignment.

3. Construction and Re-alignment of Track and Turnouts

A. Construction of Main Track 2 (MT2)

1. The Main Track 2 (MT2) will consist of Rehabilitating an Existing #10 turnout on Main Track 2 at MT2 503+64. Contractor is also required to resurface the existing Main Track 2 from MT2 Sta. 500+03 to MT2 Sta. 506+05 for a total of 602 track feet.
2. New track construction will consist of new crossties, cut-throat spikes, tie plates, anchors, and 136RE rail. All track material shall be furnished by MassDOT (See Special Conditions). Rail is to be jointed and no rail welding is envisioned. Contractor shall box anchor the tracks for 200' before and after the turnouts and anchor every third tie for the balance of the intermodal tracks.
3. Contractor is responsible to cut in and install all necessary joints and compromise joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
4. Contractor is responsible for the disposal of all defective crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Special Provisions and other Project documents.

B. Construction of Yard South Tower Track (STT)

1. The South Tower Track (STT) will consist of constructing new ballasted track with new wood crossties, new jointed rail, new spikes and anchors, and new tie plates on the prepared trackbed from STT Sta. 11+15 to STT Sta. 11+89 at the alignment and profile shown on the Contract Plans. Approximately 74 feet of new track construction will be required. Contractor is also required to resurface the existing South Tower track from STT Sta. 11+89 to STT Sta. 13+20 for a total of 131 track feet.
2. New track construction will consist of new crossties, cut-throat spikes, tie plates, anchors, and 136RE rail. All track material shall be furnished by MassDOT (See Special Conditions). Contractor shall box anchor the tracks for 200' before and after the turnouts and anchor every third tie for the balance of the intermodal.
3. Contractor is responsible to cut in and install all necessary joints and compromise joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
4. Contractor is responsible for the disposal of all defective crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Special Provisions and other Project documents.

C. Construction of Yard North Tower Track (NTT)

1. The North Tower Track (NTT) will consist of the installation of a new LH 136RE No. 10 turnout at NTT Sta. 22+46, installation of a new LH 136RE No. 8 turnout at NTT Sta. 23+63, and constructing new ballasted track with new wood crossties, new jointed rail, new spikes and anchors, and new tie plates on the prepared trackbed from NTT Sta. 21+02 to NTT Sta. 22+47 and from Sta. 24+61 to NTT Sta. 29+78 at the alignment and profile shown on the Contract Plans. Approximately 662 feet of new track construction will be required.
2. New track construction will consist of new crossties, cut-throat spikes, tie plates, anchors, and 136RE rail. All track material shall be furnished by MassDOT (See Special Conditions). New LH 136RE No. 10 turnout and new LH 136RE No. 8 turnout will be supplied by MassDOT. Contractor shall box anchor the tracks for 200' before and after the turnouts and anchor every third tie for the balance of the intermodal tracks.
3. Contractor is responsible to cut in and install all necessary joints and compromise joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
4. Contractor is responsible for the disposal of all defective crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Technical Specification, Special Conditions and other Project documents.

D. Construction of Yard Farm Bureau Track 1 (FB1)

1. The Yard Farm Bureau Track 1 (FB1) will consist of constructing ballasted track with new wood crossties, new jointed rail, new spikes and anchors, and new tie plates on the prepared trackbed from FB1 Sta. 31+96 to FB1 Sta. 36+41 at the alignment and profile shown on the Contract Plans. Approximately 445 feet of new track construction will be required. A new LH 136RE No. 8 turnout will be installed at FB1 Sta. 30+98.
2. New track construction will consist of new crossties, cut-throat spikes, tie plates, anchors, and 136RE rail. All track material shall be furnished by MassDOT (See Special Conditions). New LH 136RE No. 8 turnout will be supplied by MassDOT. Contractor shall box anchor the tracks for 200' before and after the turnouts and anchor every third tie for the balance of the intermodal tracks.
3. Contractor is responsible to cut in and install all necessary joints and compromise joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
4. Contractor is responsible for the disposal of all defective crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Special Provisions and other Project documents.

E. Construction of Yard Farm Bureau Track 2 (FB2)

1. The Yard Farm Bureau Track 2 (FB2) will consist of constructing ballasted track with new wood crossties, new jointed rail, new spikes and anchors, and new tie plates on the prepared trackbed from FB2 Sta. 40+98 to the end at approximately FB2 Sta. 44+99 at the alignment and profile shown on the Contract Plans. Approximately 401 feet of new track construction will be required.
2. New track construction will consist of new crossties, cut-throat spikes, tie plates, anchors, and 136RE rail. All track material shall be furnished by MassDOT (See Special Conditions). Contractor shall box anchor the tracks for 200' before and after the turnouts and anchor every third tie for the balance of the intermodal tracks.
3. Contractor is responsible to cut in and install all necessary joints and compromise joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
4. Contractor is responsible for the disposal of all defective crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Special Provisions and other Project documents.

F. Construction of Yard Chucky Track (CT)

1. The Chucky Track (GT) will consist of constructing ballasted track with new wood crossties, new jointed rail, new spikes and anchors, and new tie plates on the prepared trackbed from CT Sta. 50+00 to Sta. 51+31 and CT Sta. 52+29 the end at approximately Sta. 56+38 at the alignment and profile shown on the Contract Plans. Approximately 443 feet of new track construction will be required. A new RH 136RE No. 8 turnout will be installed at CT Sta. 51+31.
2. New track construction will consist of new crossties, cut-throat spikes, tie plates, anchors, and 136RE rail. All track material will be furnished by MassDOT (See Special Conditions). New RH 136RE No. 8 turnout will be supplied by MassDOT. Contractor shall box anchor the tracks for 200' before and after the turnouts and anchor every third tie for the balance of the intermodal tracks.
3. Contractor is responsible to cut in and install all necessary joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
4. Contractor is responsible for the disposal of all defective crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Special Provisions and other Project documents.

G. Rehabilitation of Existing Receiving Tracks

1. Contractor will be responsible for the rehabilitation of Receiving Tracks 1-4. Receiving Track R1 is approximately 4,430 TF in Length. Receiving Track R2 is approximately 4,310 TF in Length. Receiving Track R3 is approximately 4,250 TF in Length. Receiving Track R4 is approximately 4,260' in Length. Total for all tracks is 17,250 TF.
2. Rehabbed track work will consist of new crossties, new cut-throat spikes, relay/new tie plates, new anchors, and relay/new 115RE rail. The relay rail to be used on this project is 39' pre-drilled with 4-hole bars. The new rail purchased for this project is pre-drilled 79' rail. All track material will be furnished by MassDOT (See Special Conditions) A total of 4,000 standard cross ties will be provided for the track rehabilitation. This is about a 40% tie replacement.
3. Contractor shall box anchor the tracks for 200' before and after the turnouts and anchor every third tie for the balance of the receiving tracks.
4. Contractor is responsible to cut in and install all necessary joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
5. Contractor is responsible for the disposal of all defective crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Special Provisions and other Project documents.
6. Salvageable material shall be delivered to a MassDOT/Pan Am Southern, LLC Storage Facility within 75 miles of East Deerfield Yard and stockpiled in locations as directed by Railroad. Contractor will be responsible for properly cleaning up, grading, and preparing the areas within the Storage Facility where material is to be neatly stockpiled.

H. Removal of Existing Track

1. Contractor will be responsible for removal, dismantling, salvaging and stockpiling steel components and disposal of ties for yard track to be removed as indicated on the Contract Plans.
2. Salvageable material shall be delivered to a MassDOT/Pan Am Southern, LLC Storage Facility within 75 miles of East Deerfield Yard and stockpiled in locations as directed by Railroad. Contractor will be responsible for properly cleaning up, grading, and preparing the areas within the Storage Facility where material is to be neatly stockpiled.

4. Installation of New No. 10 Turnouts

- A. Contractor is responsible for the installation of one (1) new LH 136RE No. 10 turnout at NTT Sta. 22+46 on the North Tower Track. Contractor is responsible for the installation of one (1) new LH 115RE No. 10 turnout on the west end of track R3 (Turnout R3B). Contractor is responsible for the installation of one (1) new LH 115RE No. 10 turnout on the west end of track R4 (Turnout R4B). Contractor is responsible for the installation of one (1) new LH 115RE

- No. 10 turnout on the west end of track R5 (Turnout R5B). Contractor is responsible for the installation of one (1) new RH 115RE No. 10 turnout on the west end of track R8 (Turnout R8B). Installation of turnouts shall be prepared as new track construction. Clear, grade and remove existing ballast stone/excavation material a minimum of the bottom of the existing crosstie grade. Thoroughly compact track bed with double-drum vibratory roller. Install ballasted timber construction track on the prepared trackbed.
- B.** Contractor is responsible to cut in and install all necessary joints and compromise joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
- C.** Contractor will be responsible for properly cleaning up, grading, and restoring the areas affected by track construction.

5. Installation of New 136RE No. 8 Turnouts

- A.** Contractor is responsible for the installation of one (1) new LH 136RE No. 8 turnout at NTT Sta. 23+63 on the North Tower Track, one (1) new LH 136RE No. 8 turnout at FB1 Sta. 30+98 on the Farm Bureau 1 Track, and one (1) new RH 136RE No. 8 turnout at CTT Sta. 51+31 on the Chucky Track. Installation of turnouts shall be prepared as new track construction. Clear, grade and remove existing ballast stone/excavation material a minimum of the bottom of the existing crosstie grade. Thoroughly compact track bed with double-drum vibratory roller. Install ballasted timber construction track on the prepared trackbed.
- B.** Contractor is responsible to cut in and install all necessary joints and compromise joints with the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.
- C.** Contractor will be responsible for properly cleaning up, grading, and restoring the areas affected by track construction.

6. Rehabilitation of No. 10 Turnouts on Receiving tracks and one (1) on the Intermodal Site

- A.** Contractor is responsible for the rehabilitation of an existing #10 LH Turnout on Main Track 2 at MT2 503+64. Contractor is responsible for the rehabilitation of one (1) existing RH 115RE No. 10 turnout at the east end of Receiving Track R1(Turnout R1A), one (1) existing RH 115RE No. 10 turnout at the east end of Receiving Track R2(Turnout R2A), one (1) existing RH 115RE No. 10 turnout at the east end of Receiving Track R3(Turnout R3A), one (1) existing RH 100NH No. 10 turnout at the east end of Receiving Track R4(Turnout R4A), one (1) existing LH 115RE No. 10 turnout at the east end of Receiving Track R2(Turnout R2B). Rehabilitation of turnouts shall include the complete replacement of the turnout ties and ballasting and surfacing or turnouts after tie replacement.
- B.** Contractor is responsible to cut in and install all necessary joints and compromise joints with

the proper stagger. Joint locations shall be determined in the field by Contractor based on new rail end locations and existing rail joints. All joint locations shall be field verified and approved by MassDOT/Pan Am Southern, LLC before the rail is cut and new joints are installed.

- C. Contractor will be responsible for properly cleaning up, grading, and restoring the areas affected by track construction.

7. Ballast and Surfacing

- A. Contractor shall furnish and distribute sufficient ballast to tamp turnouts and yard tracks associated with this contract, to the design profile and alignment as shown on the Contract Plans. Turnouts and tracks to be raised no more than one inch on any given pass. This work includes all Receiving track and turnout work.
- B. Contractor is responsible for tamping and aligning all new, tracks, and turnouts as necessary and at the discretion of MassDOT/ Pan Am Southern, LLC.
- C. All ballast shall be properly regulated so as to be even with the top of crossties and broomed so that no ballast remains on the top of crossties, tie plates, or base of rail. Ballast shoulders shall be in accordance with MassDOT MW-1 Standards, Special Provisions and other Project documents. Contractor will be responsible for ballast brooming, regulating and dressing of all new, relocated, re-aligned and existing yard, and Mainline, tracks and turnouts.

8. Furnishing and Installation of Hot Mix Asphalt (HMA) Pavement and Ballast for Crossings: Gravel Borrow for Access Roads

A. Pavement Installation for Roadway Crossings

- 1. Contractor shall prepare subgrade and install 8" Hot Mix Asphalt (HMA) Pavement for crossings in locations as indicated on the Contract Plans or as directed by MassDOT/Springfield Terminal Railways. Pavement section shall consist of a minimum 5" base course and a 3" top course. Contractor also shall prepare subgrade and install 5" Hot Mix Asphalt (HMA) Pavement for approach aprons to crossings in locations as indicated on the Contract Plans or as directed by MassDOT/Pan Am Southern, LLC. Pavement section shall consist of a minimum 2" base course and a 3" top course. Contractor shall also provide Ballast for flooding the entire Farm Bureau 1 Track to allow for crossings.
- 2. All Work performed in this section shall be in accordance with this Scope of Work, the Contract Plans, Special Provisions, and Special Conditions.

B. Compacted Gravel Borrow Access Roads

- 1. Contractor shall prepare subgrade and grade access roads areas as needed.
- 2. Distribute and compact minimum 8" dense graded crushed stone (gravel borrow) in four (4) two-inch (2") lifts to create a level compacted road surface. Gravel borrow shall meet MassDOT specification for M2.01.7 Dense Graded Crushed Stone.

3. Gravel borrow access roads shall have a slight crown and drain away from the track structure where possible and shall be free of ruts and holes.

9. Clean-up and Salvage of Removed Track Materials

- A. Contractor will be responsible for clean-up, salvage, disposal, and/or delivery of all removed track materials.
 - B. All salvaged rail is to be delivered to a MassDOT or Pan Am Southern, LLC Storage Facility located within 75 miles of East Deerfield Yard. The salvaged rail is to be stockpiled together at the storage facility as directed by MassDOT/Pan Am Southern, LLC.
 - C. Contractor will be responsible for properly cleaning up, grading, and preparing the areas where material is to be stockpiled at the designated storage facility.
 - D. Switch parts for each disassembled switch shall be delivered and neatly piled together within the designated storage facility as directed by MassDOT/Pan Am Southern, LLC.
 - E. All OTM designated by MassDOT/Pan Am Southern, LLC as scrap is to be picked up, transported to, and loaded into the scrap dumpsters to be located at East Deerfield Yard for disposal by the railroad.
 - F. Contractor is responsible for the disposal of all defective crossties and switch timbers, including all pieces and portions of crossties and switch timbers. Defective crossties and switch timbers shall be taken to a Mass DEP approved disposal site and be disposed of in accordance with EPA requirements and in accordance with the Special Provisions and other Project documents.
 - G. All miscellaneous building materials, packing, and garbage shall be picked up and properly disposed of.
- C. CONTRACTOR WILL BE RESPONSIBLE FOR THE REMOVAL OF ALL TRASH, TRACKWORK PACKAGING MATERIALS, CONSTRUCTION DEBRIS AND ALL OTHER PROJECT-RELATED EQUIPMENT AND SUPPLIES FROM THE RIGHT-OF-WAY AND ADJACENT AREAS AT THE END OF EACH SHIFT AND UPON COMPLETION OF THE PROJECT WORK.**

D. CONTRACTOR QUESTIONS AND ADDENDUM ACKNOWLEDGEMENTS

Contractor questions concerning the Bid Package are due by 4:00 PM Friday, December 13, 2024. Contractor questions must be submitted through Contractor portal on COMMBUYS www.commbuys.com for the project. Any questions received after this time will not be considered for review by MassDOT. MassDOT and Owner's consultants will provide answers to questions by 4:00 PM Wednesday, December 18, 2024.

Contractors shall also email addendum acknowledgements through Contractor portal on COMMBUYS www.commbuys.com for the project.

E. This document contains the specifications and requirements for the work to be completed under the FY 2025 Track Capital Improvement Program for the East Deerfield Yard Intermodal Project.

F. Associated tasks include:

- Submittals
- Schedules of Operations
- Protection of Work and Property
- Health and Safety Program
- Implementation of Health and Safety Program
- Full Time Safety Supervisors
- Full Time Quality Control Supervisors
- Site Preparation & Environmental Mitigation Commitments
- Erosion and Sedimentation Control
- Demolition
- Excavation and Backfill
- Gravel Borrow
- Subbase and Base Courses
- Hot Mix Asphalt (HMA) Pavement
- Existing Site Utilities
- General Track Construction
- Special Trackwork
- Furnish and Install Ballast
- Construction of Yard Tracks
- Timber Crosstie
- Distribution and Installation of Crossties
- Final Surface and Align Track
- Grade Crossing (Rubber Rail Seal)
- Track Appurtenances
- Cleanup and Disposal of Defective Crossties & Timbers
- As-Built Construction Plans
- Allowances

G. These specifications are issued along with the Contract Drawings.

H. Note that some of the Specification sections listed above are included to address conditions which are not expected to be encountered during the execution of this project. It is anticipated that no subsurface structure demolition / removal will be required. These sections are included to provide direction to the Contractor in the event of unexpected circumstances.

I. For the purposes of these Specifications, the Contractor is identified as the party responsible for the performance of work as described in the Specifications.

APPLICABLE STANDARDS

A. Pertinent provisions of the following listed standards and publications shall apply to the Contract, except as they may be modified herein, and are hereby made part of these Specifications to the extent

required.

1. American Railway Engineering and Maintenance Association, Manual for Railway Engineering, latest edition, herein referred to as the AREMA Manual
2. American Railway Engineering and Maintenance Association, Portfolio of Trackwork Plans, latest edition, herein referred to as the AREMA Portfolio.
3. Roadway Worker Protection Manual and On-Track Safety Program - PAR
4. Pan Am Manual for Track Maintenance and Construction
5. MassDOT MW-1 Specification for Construction and Maintenance of Track
6. Commonwealth of Massachusetts Standard Specifications for Highways and Bridges, 2024 Edition, as amended by Supplemental Specifications
7. MBTA Railroad Operations Book of Standard Plans, Track and Roadway
8. MBTA Commuter Rail Material Specification
9. MBTA Commuter Rail Design Standards Manual

MATERIALS

- A. Materials supplied by MassDOT (Owner) are identified in the Special Provisions and meet the requirements outlined therein.
- B. Materials to be supplied by Contractor are identified in the Special Provisions and shall meet the requirements outlined therein.
- C. Contractor shall adhere to the Buy America and Build America, Buy America requirements for material in this project as set forth in the Special Provisions.
- D. Contractors are reminded that all material must meet specifications in every respect and that all work is warranted for a period of one year as stipulated by the General Contract Provisions, Article 11 – Quality Assurance.

REQUIRED MOW EQUIPMENT

- A. Contractor shall submit a list of construction equipment to be used including its weights and dimensions. The equipment will not be permitted on Owner/Railroad property until it has been approved.
- B. Contractor shall verify that his track-mounted or Hi-Rail equipment complies with the standards set by the AAR Mechanical Division.
- C. Operate only equipment in a good state of repair and with all safety appliances and protective devices in place and functional.
- D. Rail wheels with flat spots of length exceeding 8 percent of the wheel diameter are prohibited. Any equipment with a wheel with a flat spot exceeding 5 percent of the wheel diameter is restricted to a

maximum speed of 10mph on bridges.

- E. Contractor's equipment shall not exceed the design loads for any track or structure. Contractor shall verify that proposed equipment meets these requirements.
- F. Contractor's equipment shall physically clear all fixed obstructions within the limit of the project, including signal and power installations. Any damage caused by Contractor will be repaired or replaced as determined by the Railroad at no additional cost to Owner or Railroad.
- G. To ensure that production rates and quality standards are met, it is required that all crossties/timbers shall be installed and gaged utilizing mechanical methods. As a result, Contractor will be required to furnish, in good working order, and use daily, at a minimum, the following pieces of standard railroad equipment:
 - 1 Mark IV Production Tamper or approved equal with functioning track geometry computer with printable readouts. (Note: A production type tamper, Harsco 6700 or approved equal, may be used under the direct supervision of the on-site survey crew)
 - 1 Hi-Rail Dump1 KBR-850 or approved equal Ballast Regulator w/ Broom

In addition, the following personnel and equipment are needed when the Production Tamper is in service:

- One (1) qualified mechanic properly outfitted with a mechanic's truck with fluids, parts and tools will be on site at all times when the Production Tamper is in service.
- Survey Crew in the event that the Production Tamper's computer geometry system is not able to align and surface the track per the Contract Plans.

QUALITY CONTROL

- A. Contractor shall be experienced in the construction of the various types of trackwork included in this Contract. Such experience shall have been gained on at least three (3) previous contracts of similar volume of work with other North American transit properties or railroads.
- B. Contractor shall adequately supervise their personnel, equipment and processes to ensure the requirements of these specifications are being met at all times during the production process.
- C. Contractor shall have at least one (1) qualified Supervisor and one (1) qualified Foreperson on site at all times to oversee, instruct and assure quality workmanship. Supervisor's function is to supervise and ensure quality, not to operate equipment.
- D. Contractor shall perform all measures necessary to assure quality of the Work. This shall include source quality control and field quality control requirements.
- E. Quality shall be monitored at all times. Owner and Railroad shall provide continuous inspection of all work to ensure consistency and quality.
- F. Contractor shall have on site at all times a sufficient number of qualified Machine Operators to ensure safe operation and quality workmanship.
- G. Contractor shall ensure there is a sufficient number of Laborers to perform all tasks as needed for crosstie and QC operations.

- H. Contractor shall have a qualified Mechanic on site at all times during switch installation and track realignment operations. The mechanic shall be equipped with a truck that contains sufficient tools, replacement parts, and fluids for the equipment listed under the Required MOW Equipment Section.

REQUIRED NUMBER OF PRODUCTION TAMPER PASSES

- A. A minimum of two (2) passes is required throughout the reconstructed track area. Track stabilization and ballast compaction shall be approved by the Owner's Authorized Representative prior to the installation of any grade crossing material.

REMOVAL OF METAL TRACK MATERIAL

- A. All rail, switch stands, frogs, spikes, plates, anchors, and OTM removed and/or replaced as part of this contract shall be collected and delivered to Railroad for re-use or scrap. Material shall be delivered to a MassDOT storage facility within 75 miles of the project site as directed by Owner's Authorized Representative or Railroad.
- B. Track materials furnished by Contractor, but not installed, are to be collected by Contractor and delivered to a secure MassDOT material storage facility within 75 miles of the project site(s). The unused track material will become the property of MassDOT.

DISPOSAL OF EXCAVATED MATERIAL

- A. The area excavated for new and relocated trackwork shall be to the limits shown the Contract Plans.
- B. The wasting of excavated reusable material is to be done alongside the Railroad Right-of Way within five (5) miles of the excavation site as directed by the Owner's Authorized Representative or Railroad.

CLEANUP AND DISPOSAL OF DEFECTIVE CROSSTIES, CROSSING TIMBER AND WOOD MATERIAL

A. Disposal Regulations

1. Contractor shall notify MassDOT which facility will be used to dispose of crossties. A copy of the MassDEP certification showing that it is an approved creosote treated tie disposal facility along with all weight slips for crossties sent to an approved facility shall be provided to Owner and Railroad.

B. Disposal of Old Crossties

1. Contractor is responsible for the cleanup of all crossties on the Railroad Right-of-Way including those from previous crosstie installation projects. All old crossties and timbers are to be picked up, bundled (if possible), and disposed of at a Mass DEP approved disposal site as specified in the Special Provisions. Wood pickup is to be done concurrently with installation of crossties.

C. Production Rates

1. Scrap crossties and other wood products shall be removed from the right of way within five (5) working days of their removal from the track.

2. Piles of scrap crossties and other wood products are permitted at locations agreed upon between Contractor and Railroad. Such staging piles must be removed within thirty (30) days of completion of the crosstie installation phase of this Contract.

END OF SECTION

SUBMITTALS

GENERAL

- A. This Section specifies the general requirements and procedures for preparing and transmitting data to the Engineer for his/her information, acceptance or approval. Submittals should be made to the MassDOT (Owner's) Engineer and Pan Am Southern, LLC (Railroad) for all materials supplied by Contractor.

GENERAL PROCEDURES

- A. Transmit submittals sufficiently in advance of construction requirements to permit a maximum of five (5) calendar days for checking and appropriate action by MassDOT's Consulting Engineers and/or Pan Am Southern, LLC.
- B. Submit all work-related submittals as defined in this Section and as required by Contract Documents on a Transmittal Form: Prepare draft of required transmittal form and submit it to Engineer for acceptance. At a minimum, furnish: transmittal forms sequentially numbered and show contract number, project name, date; names of subcontractors, suppliers, manufacturers, and required specification references; category and type of submittal, purpose, description, distribution record (for both transmittals and submittals) and signature of transmitter.
1. Examine and check submission for accuracy, completeness, and compliance with Contract before delivery to Engineer.
 - a. Stamp and sign each submission with following statement: "Having checked this submission, we certify that it conforms to the requirements of the Contract in all respects, except as otherwise indicated."
 - b. By reviewing and approving each submittal, Contractor represents that he has determined and verified materials, field measurements and field construction criteria related thereto, and has checked and coordinated information contained within such submittals with requirements of Work and Contract.
 - c. Submit one construction material or one drawing per submittal review.
 2. Maintain at site of work a complete up-to-date, organized file of all past and current submittals including an index and locating system, which identifies the status of each submission.
 - a. Assign sequential numbers to each submittal.
 - b. Assign new submittal numbers to all re-submissions and cross-reference to previous submittals.
 - c. Certify shop drawings, working drawings and calculations as submitted by a professional engineer registered in the Commonwealth of Massachusetts when required by individual Specification Sections. Convey, or be accompanied by, information sufficient to completely explain the structures, machines, or systems described and their intended manner of use. When professional certification is required by Contract requirements, Engineer is entitled to rely upon accuracy and completeness of such calculations and certifications.

3. Engineer's Review and Action

- a. Engineer will review and approve or take other appropriate action upon Contractor's submittals only for the limited purpose of reviewing for conformance with information given and design concept expressed in Contract requirements. Engineer's action will be taken as to cause no delay in Work or in activities of Contractor. Review of such submittals is not conducted for purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain responsibility of Contractor as required by Contract. Engineer's review will not constitute approval of safety precautions or, unless specifically stated by Engineer, of any construction means, methods, techniques, sequences or procedures. Engineer's review of a specific item does not indicate approval of entire assembly of which the item is a component.
- b. Time required for review of submittals and resubmittals by Engineer will be a maximum of 5 calendar days, except as otherwise specified.
- c. All Contractors' submittals will be stamped with one of following dispositions.
 - 1) NO EXCEPTIONS TAKEN: Work may proceed, provided it complies with Contract. Approval of shop drawings and samples will be general, but approval is not construed:
 - a) As relieving Contractor of responsibility for any errors or omissions, including details, dimensions, and quantity of materials; or
 - b) As approving departures from details furnished by Engineer.
 - 2) EXCEPTION AS NOTED: Work may proceed, provided it complies with Contract and changes shall be made by Contractor. Resubmission not required. Exception, as noted, will be general. The above dispositions will be general, but approval or exceptions noted shall not be construed as:
 - a) Permitting any departure from Contract requirements;
 - b) Relieving Contractor of responsibility for any errors or omissions, including details, dimensions, and quantity of materials; or
 - c) As approving departures from details furnished by Engineer.
 - 3) REVISE AND RESUBMIT: Work recognized as not being able to proceed. Revise submittal in accordance with notations thereon and resubmit without delay.
- d. Handle re-submissions in the same manner as first submittals. On re-submissions, direct specific attention in writing to revisions other than the corrections on previous submissions. Make any correction required by Engineer.
- e. Failure of any material to pass specified tests is sufficient cause for refusal to consider, under this Contract, further samples of same brand or make of that material. Engineer reserves right to disapprove any material or equipment previously proven unsatisfactory in service.
- f. Samples of various materials on site, stored or in place may be taken by Contractor for testing. Samples failing to meet Contract requirements will automatically void approval of items tested. Replace such materials or equipment to meet Contract requirements. When tests are required, make only one test of each sample. Samples that do not meet specified requirements will be rejected. Additional testing of samples will be made by Engineer at Contractor's expense.

C. Requirements for shop drawings

1. Shop drawings shall include fabrication details of all special trackwork material, including, but not limited to rail, frog, switch points, insulated joint plugs, joint assemblies, fasteners, tie plates, switch rods and switch stand, and any other supplementary data required by the Engineer.
2. Detail drawings for cribs, cofferdams, falsework, shoring, decking, form work, and for other temporary work and methods of construction the Contractor proposes to use, will be required to be furnished. Such drawings shall be subject to review, but details of design will be left to the Contractor who shall be responsible for the safety and successful construction of the Work. Drawings, the original design for which is the responsibility of the Contractor, shall bear the seal of a Professional Engineer registered in the Commonwealth.
3. Shop drawings shall show design, dimensions, connections, and other details necessary to ensure that the Contract Documents are accurately interpreted. Shop drawings shall show proper connections with adjoining work in detail. Where adjoining work requires shop drawings, such drawing must be submitted for approval at the same time so that connections can be accurately checked.
4. Shop drawings shall establish the actual detail of all manufactured or fabricated items, indicate proper relation to adjoining work and amplify design details of mechanical and electrical equipment in the physical spaces in any structure and incorporate minor changes of design or construction details to suit actual conditions. Where separate sections or trades are involved, shop drawings shall be coordinated and where required by the Engineer shall be submitted in composite form (coordination drawings) clearly designating which trade will perform which work; the words "work by others" will not be accepted.
5. All requests for approval of materials and equipment and submissions of drawings shall indicate the corresponding number of the section and paragraph of the Specifications and reference to the Contract Drawing sheet numbers under which each of the above are required.
6. All shop drawings shall be thoroughly checked by Contractor for compliance with the Contract Documents before submitting them to Engineer for approval and shall bear Contractor's stamp of approval certifying that they have been so checked. Shop drawings submitted without the stamp of approval and certification, or which are incomplete, contain numerous errors, have not been checked, or have been checked only superficially will be returned unchecked by Owner and Railroad for resubmission by Contractor. Contractor shall certify: "This shop drawing has been thoroughly checked and complies with the Contract Documents and field measurements and the item fits with adjoining work except as noted."
7. In checking shop drawings, Contractor shall verify all dimensions and field conditions and shall check and coordinate the shop drawings with the requirements of all other Sections, adjoining materials or trades whose work is related thereto, as required for the proper and complete installation of the work.

D. When submitting shop drawings or working drawings for approval or review by the Engineer, the following procedures shall apply:

1. Submit to Engineer with such promptness as to cause no delay in his work, two copies of prints to be checked and approved by him, of all shop drawings and detail drawings required for the work.
 2. Engineer will make a prompt decision on approval of such drawings no later than five (5) days after submittal; but if such decision requires extended investigation and study, Engineer will, within five (5) days after the receipt of the submission, give the party making the submission written notice of the reason why the decisions cannot be made within the five (5) day period and the date by which the decisions will be made.
 3. Markings of approval, or of corrections required, will be made on a copy of the submittal by the Engineer and record copies made by Engineer for his own use will be at Railroad and Owner's expense.
 4. If corrections are required by the Engineer, make such corrections and resubmit the drawings, again as three prints, and PDF copy of the submittal to Engineer for approval. If corrections are still required, the same procedure shall be carried out until the drawings are acceptable.
 5. Upon Engineer's approval, furnish Engineer two corrected prints.
 6. All items shown on shop drawings shall be clearly identified with their location in the Contract, or by the sheet or detail number in which they appear, in order to facilitate checking by Owner and Railroad.
- E.** Upon completion of the Work, submit to Engineer all files (AutoCAD, Word Documents, PDF) associated with each shop drawing only, which shall become the property of Railroad and Owner. Contractor will submit a disc with all files associated with the shop drawings to Railroad, Owner and Engineer.
- F.** Resolution of the shop drawings copies / prints shall be readable.
- G.** Portions of the shop drawings copies / prints, which are not readable, shall be replaced, at no expense to Owner and Railroad.
- H.** Contract prices shall include the cost of furnishing all shop and detail drawings as specified.
- I.** Progress Photographs - Progress photographs are required to be taken by Contractor. Ten (10) 8x10-inch color photographs (including slides of these photographs) of progress and construction operations shall be required each week.

REQUESTS FOR INFORMATION

- A.** Upon discovery of the need for interpretation of the Contract Documents, Contractor shall prepare and submit a Request for Information (RFI). RFIs shall not be used to request approval of submittals, request approval of design changes or substitutions, nonconforming conditions, or requests for changes to Contract schedule and/or Quantities.
1. RFIs shall be issued by Contractor to Engineer. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner as to avoid delays in the work.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:

1. Project Name
2. Contract Number
3. Date
4. Name of Contractor
5. RFI Number, numbered sequentially
6. Specification Section number and title and related paragraphs, as appropriate
7. Drawing number and detail references, as appropriate
8. Field dimensions and conditions, as appropriate
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Completion Date or Quantities, Contractor shall state the impact in the RFI.
10. Contractor's signature
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe item needing interpretation.

C. RFI Log: Prepare, maintain and submit a log of RFIs organized by the RFI number containing the following information:

1. Project Name
2. Project Contract Number
3. Name of Contractor
4. RFI number and Revision Indicator
5. RFI Description
6. Date RFI was submitted
7. Date Response Required
8. Date Response Received
9. Date Closed

D. Engineer's Action: Engineer will review each RFI, determine action required and return to Contractor within five (5) days. Any change to the Contract Completion Date or Quantities may result in a change being submitted.

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

SCHEDULE OF OPERATIONS

GENERAL

- A.** This Section specifies the general requirements and procedures to track and document the progress of the Work from Notice to Proceed (“NTP”) through the Contractor Field Completion (“CFC”) Milestone. The Contractor’s schedules will be used by the Engineer to monitor project progress, plan the level-of-effort required by the Department’s work force and consultants and as a critical decision-making tool.
- B.** The Contractor's approach to prosecution of the Work shall be disclosed to MassDOT by submission of a Critical Path Method (CPM) schedule. These requirements are in addition to, and not in limitation of, requirements imposed in other sections.
- C.** The requirements for scheduling submissions are summarized below. Complete descriptions of all detailed requirements are established elsewhere in this specification.
 - a.** Bar chart schedule updated monthly or at the request of the Engineer. One (1) time scaled bar chart containing all activities shall be prepared and submitted using a scale that yields readable plots. Activities shall be linked by logic ties and shown on their Early Dates. Critical Paths shall be highlighted, and Total Float shall be shown for all activities.
 - b.** A second time scaled bar chart shall also be prepared containing only the Critical Path or, if the Critical Path is not the longest path, the Longest Path using a scale that yields readable plots. Activities shall be linked by logic ties and shown on their Early Dates. Total Float shall be shown for all activities.
 - c.** Bar Charts shall be printed in color and submitted on 11” X 17” paper or, if approved by the Engineer, as a .pdf file.
 - d.** Monthly Projected Spending Report (PSR). A Projected Spending Report (PSR) shall be prepared and submitted in accordance with the instructions listed at the end of this section. The PSR shall indicate the monthly spending (cash flow) projection for each month from NTP to Contractor Field Completion (CFC). Each month’s actual spending shall be calculated using all CQEs paid during that month. If the difference between the Contractor’s monthly projections vs. the actual spending is greater than 10%, the Contractor’s monthly spending projection shall be revised and resubmitted within fifteen (15) Calendar Days. The Projected Spending Report (PSR) shall be depicted in a tabular format and printed in color on 11 x 17-sized paper or larger as approved by the Engineer.
- D.** The schedules shall divide the Work into activities with appropriate logic ties to show:
 - a.** the Contractor's overall approach to the planning, scheduling and execution of the Work;
 - b.** conformance with any additional sequences of Work required by the Contract Documents.

SCHEDULE PLANNING SESSION

- A.** The Contractor shall conduct a schedule planning session within seven (7) Calendar Days after the Contractor receives the NTP and prior to submission of the Baseline Schedule. This session will be

attended by MassDOT and its consultants. During this session, the Contractor shall present its planned approach to the project including, but not limited to:

1. the Work to be performed by the Contractor and its subcontractors;
 2. the planned construction sequence and phasing; planned crew sizes;
 3. summary of equipment types, sizes, and numbers to be used for each work activity;
 4. all early work related to third party utilities;
 5. identification of the most critical submittals and projected submission timelines;
 6. estimated durations of major work activities;
 7. the anticipated Critical Path of the project and a summary of the activities on that Critical Path;
 8. a summary of the most difficult schedule challenges the Contractor is anticipating and how it plans to manage and control those challenges;
 9. a summary of the anticipated quarterly cash flow over the life of the project.
- B.** This will be an interactive session and the Contractor shall answer all questions that MassDOT and its consultants may have. The Contractor shall provide a minimum of five (5) copies of a written summary of the information presented and discussed during the session to the Engineer. The Contractor's Baseline Schedule and accompanying Schedule Narrative shall incorporate the information discussed at this Schedule Planning Session.

DURATIONS

- A.** Activity durations shall be in Work Days. Planned Original Durations shall be established with consideration to resources and production rates that correspond to the Contractor's Bid Price. Within all of the Department-required schedules, the Contractor shall plan the Work using durations for all physical construction activities of no less than one (1) Work Day and no greater than fourteen (14) Work Days, unless approved by the Engineer as part of the Baseline Schedule Review.
- B.** Should there be an activity with a duration that is determined by the Engineer to be unreasonable, the Contractor will be asked to provide a basis of the duration using bid documents, historic production rates for similar work, or other form of validation that is acceptable to the Engineer. Should the Contractor and the Engineer be unable to agree on reasonable activity durations, the Engineer will, at a minimum, note the disagreement in the Baseline Schedule Review along with a duration the Engineer considers reasonable and the basis for that duration. A schedule that contains a substantial number of activities with durations that are deemed unreasonable by the Engineer will not be accepted.

ACTIVITIES

- A.** The schedules shall clearly define the progression of the Work from NTP to Contractor Field Completion (CFC) by using separate activities for each of the following items:
1. NTP
 2. Each component of the Work defined by specific activities
 3. Detailed activities to satisfy permit requirements
 4. Procurement of fabricated materials and equipment with long lead times, including time for

review and approval of submittals required before purchasing

5. The preparation and submission of shop drawings, procedures and other required submittals, with a planned duration that is to be demonstrated to the Engineer as reasonable
6. The review and return of shop drawings, procedures and other required submittals, approved or with comments, the duration of which shall be thirty (30) Calendar Days, unless otherwise specified or as approved by the Engineer
7. Interfaces with adjacent work, utility companies, other public agencies, sensitive abutters, and/or any other third-party work affecting the Contract
8. The Critical Path, clearly defined and organized
9. Float shall be clearly identified
10. Access Restraints – restrictions on access to areas of the Work that are defined by MassDOT in the bid package, in Subsection 8.06 – Limitations of Operations or elsewhere in the Contract
11. Milestones listed in the Contract Documents
12. Subcontractor approvals at fifteen (15) Calendar Days from submittal to response
13. Substantial Completion Contract Milestone
14. Contractor's request for validation of Substantial Completion
15. Punchlist Completion Period of at least thirty (30) Calendar Days
16. Contractor confirmation that all punch list work and documentation has been completed
17. Physical Completion of the Work Contract Milestone
18. Documentation Completion
19. Contractor Field Completion Contract Milestone
20. Traffic work zone set-up and removal, night work and phasing
21. Material Certifications

ACTIVITY DESCRIPTIONS

- A. The Contractor shall use activity descriptions in all schedules that clearly describe the work to be performed using a combination of words, structure numbers, station numbers, bid item numbers, etc.

CALENDARS

- A. Different calendars may be created and assigned to all activities or to individual activities. Calendars define the available hours of work in each Calendar Day, holidays and general or project-specific non-Work Days such as Fish Migration Periods, time of year (TOY) restrictions and/or area roadway or track restrictions.
- B. Examples of special calendars include, but are not limited to:
 - Winter Shutdown Period, specific work is required by separate special provision to be performed during the winter.
 - Peak traffic hours on heavily traveled roadways. This shall be from 6:30 am to 9:30 am and from 3:30 pm to 7:00 pm, unless specified differently elsewhere in the Contract.

- Special requirements by sensitive abutters, railroads, utilities and/or other state agencies as defined in the Contract.
- Utility Restrictions shall be as specified within the Contract.

NOT TO BE USED IN THE CONTRACTOR'S CPM SCHEDULE

- A. Milestones or constraint dates not specified in the Contract
- B. Scheduled work not required for the accomplishment of a Contract Milestone
- C. Use of activity durations, logic ties and/or sequences deemed unreasonable by the Engineer
- D. Delayed starts of follow-on trades
- E. Float suppression techniques

NARRATIVE

- A. A written narrative shall be submitted with every schedule submittal. The narrative shall:
 1. itemize and describe the flow of work for all activities on the Critical Path in a format that includes any changes made to the schedule since the previous Contract Progress Schedule / Monthly Update or the Baseline Schedule, whichever is most recent;
 2. provide a description of any specification requirements that are not being followed. Identify those that are improvements and those that are not considered to be meeting the requirements;
 3. provide all references to any Notice of Delay that has been issued, within the time period of the Contract Progress Schedule Update, by letter to the Engineer. Note that any Notice of Delay that is not issued by letter will not be recognized by the Engineer. See Notice of Delay;
 4. provide a description of all critical issues that are not within the control of the Contractor or the Division (third party) and any impact they had or may have on the Critical Path;
 5. provide a description of any possible considerations to improve the probability of completing the project early or on-time;
 6. compare Early and Late Dates for activities on the Critical Path and describe reasons for changes in the top three (3) most critical paths;
 7. describe the Contractor's plan, approach, methodologies and resources to be employed for completing the various operations and elements of the Work for the top three (3) most critical paths. For update schedules, describe and propose changes to those plans and verify that a Proposal Schedule is not required;
 8. describe, in general, the need for shifts that are not 5 days/week, 8 hours/day, the holidays that are inserted into each calendar and a tabulation of each calendar that has been used in the schedule;
 9. describe any out-of-sequence logic and provide an explanation of why each out-of-sequence activity does not require a correction, if one has not been provided, and an adequate demonstration that these changes represent the basis of how these activities will be built, including considerations for resources, dependencies and previously-approved production rates;
 10. identify any possible duration increases resulting from actual or anticipated unit price item quantity overruns as compared to the baseline duration, with a corresponding suggestion to

- mitigate any possible delays to the Critical Path. If the delay is anticipated to impact the Critical Path submit a letter to the Engineer notifying of a potential delay;
11. include a schedule log consisting of the name of the schedule, the data date and the date submitted.

BASELINE SCHEDULE

- A.** The Baseline Schedule shall be due thirty (30) Calendar Days after Notice to Proceed (NTP.) The Baseline Schedule shall only reflect the Work awarded to the Contractor and shall not include any additional work involving Extra Work Orders or any other type of alleged delay. Once the Baseline Schedule has been accepted by the Engineer, with or without comments, it shall represent the as-planned schedule for the Work and become the Contract Progress Schedule of Record until such time as the schedule is updated or revised under Contract Progress Schedules / Monthly Updates.
- B.** The Engineer's review comments on the Baseline Schedule and the Contractor's responses to them will be maintained for the duration of the Contract and will be used by the Engineer to monitor the Contractor's Work progress by comparing it to the Contract Progress Schedule / Monthly Update.

CONTRACT PROGRESS SCHEDULES / MONTHLY UPDATES

- A.** All schedules shall be prepared and submitted in accordance with the requirements listed below. Each monthly Contract Progress Schedule submittal shall be uniquely identified.
- B.** The first Contract Progress Schedule shall be submitted by the Contractor no later than seventy (70) Calendar Days after NTP. The data date for this first Progress Schedule shall be sixty (60) Calendar Days after NTP. Subsequent Progress Schedules shall be submitted monthly.
- C.** Each Contract Progress Schedule shall reflect progress up to the data date. Updated progress shall include actual start dates, remaining Work Days and actual finish dates for each activity but shall not change any activity descriptions, durations or resources (as planned at the time of bid), without the acceptance of the Engineer. For any proposed changes to the schedule, including sequencing, description or duration of future activities or planned resource costs, the Contractor shall submit to the Engineer for approval a written notice of the proposed change, which includes a reason for the change and any implications for resources and production rates. Once approved by the Engineer, the Contractor may incorporate the changes in the next Contract Progress Schedule/Monthly Update with the affected activities clearly identified.
- D.** Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule if any Contract Progress Schedule/Monthly Update indicates a failure to meet the Contract Dates.

SHORT-TERM CONSTRUCTION SCHEDULE

- A.** The Contractor shall provide a Short-Term Construction Schedule that details daily work activities, including any multiple shift work that the Contractor intends to conduct, in a bar chart format. The daily activities shall directly correspond to the Contract Progress Schedule activities, with a matching reference to the activity identification number in the Contract Progress Schedule and may be at a greater level of detail.

- B.** The Short-Term Construction Schedule shall be submitted every two weeks. It shall display all work for a thirty-five (35) Calendar Day period consisting of completed work for the two (2) week period prior and all planned work for the following three (3) week period. The initial submission shall be provided no later than thirty (30) Calendar Days after NTP or as required by the Engineer.
- C.** The Contractor shall be prepared to discuss the Short-Term Construction Schedule, in detail, with the Engineer in order to coordinate field inspection staff requirements, the schedule of work affecting abutters and any corresponding work with affected utilities. Failure to submit Short-Term Construction Schedules every two (2) weeks may result in withholding of full or partial payments by the Engineer.

SCHEDULE REVIEWS BY MASSDOT

- A. Baseline Schedule Reviews**

The Engineer will respond to the Baseline Schedule Submission within thirty (30) Calendar Days of receipt providing comments, questions and/or disposition that either accepts the schedule or requires revision and resubmittal. Baseline Schedules shall be resubmitted within fifteen (15) Calendar Days after receipt of the Engineer's comments.
- B. Contract Progress Schedule / Monthly Update Reviews**

The Engineer will respond to each submittal within twenty-one (21) Calendar Days. Schedules shall be resubmitted by the Contractor within five (5) Calendar Days after receipt of the Engineer's comments. Failure to submit schedules as and when required could result in the withholding of full or partial pay estimate payments by the Engineer.

IMPACTED SCHEDULE REQUIREMENTS – NOTICE OF DELAY

- A.** The Contractor shall notify the Engineer in writing, with copies to MassDOT, within three (3) Calendar Days of the start of any delays to the Critical Path that are caused by actions or inactions that were not within the control of the Contractor. Delay notifications that are not provided in a letter to the Engineer will not be recognized as contractual notice in the determination of any Time Extension related to the impacts to the Work associated with this specific alleged delay. The Engineer will evaluate the alleged delay and its impact and will respond to the Contractor within ten (10) Calendar Days after receipt of a notice of delay.

RECOVERY SCHEDULES

- A.** The Contractor shall promptly report to the Engineer all schedule delays during the prosecution of the Work. Except as otherwise designated by a Contract Modification, no Contract Progress Schedule that extends performance beyond the Contract Time and/or beyond any Contract Milestone shall be approved by the Engineer. The Contractor shall submit a Recovery Schedule within fourteen (14) Calendar Days of a Contract Progress Schedule submission that shows failure to meet the Contract Dates. This requirement is critical to MassDOT's ability to make informed decisions regarding Contract Time and costs.
- B.** During the prosecution of the Work, should the Contractor's progress on a critical operation clearly not meet anticipated production, without cause by fault of MassDOT, or should a critical activity or series of activities not be staffed in accordance with the Contractor's approved Baseline Schedule

resource planning, the Contractor shall be obligated to recover such delay. Recovery Schedules shall be prepared and submitted within fourteen (14) Calendar Days of any of the cases listed above.

- C. Recovery Schedules shall clearly indicate any proposed overtime hours, additional shifts, and the resources that are proposed to be incorporated into the schedule. The Engineer shall have final discretion over the use of overtime hours and additional shifts and shall have the right to require that overtime hours and/or additional shifts be used to minimize the duration of Time Extensions, without additional compensation for any Contractor delays, if it is determined to be in the best interest of MassDOT to do so.
- D. During the review of any Recovery Schedule, all Contract Progress Schedules shall continue to be required every month. Changes represented in accepted Recovery Schedules shall be incorporated into the next Contract Progress Schedule.

DISPUTES

- A. All schedules shall be submitted, reviewed, dispositioned and accepted in the timely manner specified herein so as to provide the greatest possible benefit to the execution of this Contract. Any dispute concerning the acceptance of a schedule or any other question of fact arising under this subsection shall be determined by the Engineer. Pending resolution of any dispute, the last schedule accepted by the Engineer will remain the Contract Schedule of Record.

COMPENSATION

- A. The Bid Form will specify the fixed-price amount to be paid to the Contractor for the Project Schedule requirements contained herein.
- B. All required schedule-related Work, including, but not limited to computers, computer software, the planning and coordination with utilities, training, schedule preparation and schedule submittals will be paid for under the fixed price amount.
- C. This fixed price amount is for payment purposes only and is separate from what the Department considers to be the Contractor's General Condition costs. If the Contractor deems it necessary to include additional costs to provide all of the requirements of this section, these additional costs shall be included in the Contractor's overall bid price.
- D. Twenty percent (20%) of this pay item will be paid upon the Engineer's acceptance of the Contractor's Baseline Schedule, prepared and submitted in accordance with this Specification.
- E. The remaining eighty percent (80%) of this pay item will be paid in equal monthly installments distributed across the Contract Duration from Notice to Proceed (NTP) to Contractor Field Completion (CFC), less the 2 months required for the submittal and review of the Baseline Schedule in accordance with the following formula:

$$\text{Monthly Payment} = \frac{\text{Remaining Fixed Price amount (80\% of Item 100.)}}{\text{Contract Duration in whole months} - 2 \text{ months}}$$

- F.** The timely and accurate submission of the Baseline Schedule is critical to the Contract and the Department's ability to make informed decisions. Only payment under Mobilization will be made until the Baseline Schedule is accepted by the Engineer.
- G.** No payment for any other pay item will be processed beyond seventy-five (75) Calendar Days from Notice to Proceed (NTP) until the Baseline Schedule is accepted by the Engineer. Until the Engineer's acceptance of the Baseline Schedule, the combined total of all payments made to the Contractor will be limited to an amount no greater than the total price for Mobilization or 3% of the contract price, whichever is less.
- H.** All Contract Progress Schedule Updates submitted later than forty (40) Calendar Days from the Data Date of the previous submission, will be deemed to be no longer useful and will not qualify for payment. Late submittal of missed Contract Progress Monthly Updates will not result in recovery of the previously forfeited portion of the Schedule of Operations Fixed Price Payment Item.
- I.** Failure to submit schedules that are acceptable to the Engineer as and when required may result in the forfeiture of that portion of the Schedule of Operations Fixed Price Payment.
- J.** The Contractor's failure or refusal to comply with the requirements of this Section shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence and may result in the withholding of full or partial payments by the Engineer.
- K.** Should there be a Time Extension granted to the Contractor, the Engineer may provide an Equitable Adjustment for additional Contract Progress Schedule Updates at intervals directed by the Engineer. The Schedule of Operations Item will be the basis for this Equitable Adjustment.

END OF SECTION

PROTECTION OF WORK AND PROPERTY

GENERAL

- A.** Work Included: This Section specifies the general requirements for the temporary protection of work and property during the Contract period.

TEMPORARY PROTECTION

- A.** Protect the following:

1. Existing mainline, siding, and yard tracks from damage and impacts.
2. Existing railroad culverts, bridges and grade crossings.
3. Existing public and private access paths and utility easements and crossings.
4. Existing railroad ties, rail, turnouts, OTM, bumping posts and signal equipment.
5. Existing railroad rolling stock and railroad equipment within the work area.
6. Existing platforms, buildings and maintenance facilities.
7. Existing track drainage ditch, drainage pipes and drainage structures.
8. Existing on site utility structures

- B.** After work is properly completed, be responsible for protecting work and for repairing, replacing, and cleaning of damaged work, so that all work is complete at the time of acceptance of the work.

- C.** Remove all temporary protection and coverings at the completion of the Work.

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

HEALTH AND SAFETY PROGRAM

- A. It is the Contractor's ultimate responsibility to ensure the health and safety of all the Contractor's employees and subcontracting personnel, the Engineer and his/her representatives, and the public from any on-site chemical contamination.

GENERAL

- A. The Health and Safety Program shall include the components required by OSHA 29 CFR 1910.120(b), be designed to identify, evaluate, and control health and safety hazards and provide for emergency response if needed, and be a dynamic document with provisions for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public.
- B. The Health and Safety Program provided by the Contractor shall comply with all the appropriate regulations that address employee working conditions (e.g. OSHA, RCRA, CERCLA). In addition, guidelines of NIOSH, OSHA, USCG, EPA, etc., shall be followed. Equipment used for the purpose of health and safety shall be approved and meet pertinent standards and specifications of the appropriate regulatory agencies.
- C. The Health and Safety Program (HASP) shall be submitted to the Engineer for acceptance at least four weeks prior to commencement of Work. The review and acceptance of the HASP by MassDOT does not relieve the Contractor of the responsibility for attaining the required degree of protection and training, or to comply with all laws, rules, regulations, standards or guidelines in effect during the execution of the contract.
- D. A copy of the Health and Safety Program shall be maintained on-site at all times by the Contractor. The on-site copy shall contain the signature of the Engineer and each on-site employee of MassDOT, Contractor and sub-Contractors. The employee's signature on the Health and Safety Plan shall be deemed prima facie evidence that the employee has read and understands the plan. A copy of the plan with signatures shall be submitted to the Engineer at the conclusion of the contract, or at the Engineer's request. Signature sheets shall be submitted monthly, or at the request of the Engineer.

49 CFR PART 219 & 243 COMPLIANCE

- A. FRA's rule requires the Contractors and Subcontractors working on a railroad right-of-way be subject to all 49 CFR Part 219 testing and 49 CFR Part 243 training. MassDOT requires certification that the Contractor and Subcontractors are in compliance with the requirements of 49 CFR Parts 219 and 243. The Contractor and Subcontractor must submit receipt (not approval) of each plan. Once received, a copy of each FRA acknowledgement letter is to be immediately forward to MassDOT, along with certification from the Contractor and Subcontractors that their plan complies with the requirements of 49 CFR Part 219 or 49 CFR Part 243. The FRA acknowledgement letters and contractor certifications will be part of the compliance records.
- B. The contractor and Subcontractors will be prohibited from performing work until they are in compliance with 49 CFR Parts 219 and 243. Any delays related to failure to comply with these requirements will be considered a non-excused delay under the contract.

SITE SPECIFIC INFORMATION

- A. This site has not been evaluated for contamination.

COMPENSATION

- A. The Work described under the Specification shall be incidental to the project and to the pay items listed in the Bid Form. No payment will be made under this item.

END OF SECTION

IMPLEMENTATION OF HEALTH AND SAFETY PROGRAM

GENERAL

- A.** For all construction activities that require handling or exposure to regulated soils, the Health and Safety Program shall specify an on-site Health and Safety Officer. The on-site Health and Safety Officer duties shall include, but are not limited to: implementation of the site Health and Safety Program, training, evaluating risks, safety oversight, determining levels of personnel protection required, and performing any required monitoring at the site. A Daily Log shall be kept by the on-site Safety Officer and provided weekly to the Engineer. This log shall be used to record a description of the weather conditions, levels of personnel protection being employed, monitoring data and any other information relevant to on-site safety conditions. The on-site Health and Safety officer shall sign and date the Daily Log.
- B.** The level of protection, relative to respiratory and dermal hazards, required to ensure the health and safety of on-site personnel will be stipulated in the Health and Safety Program and will be subject to modification by the on-site Safety Officer based on changing site and weather conditions and the following factors: type of operation or activity, chemical compounds identified on-site, concentration of the chemicals, physical state of the hazardous materials, potential duration of exposure to hazardous materials, dexterity required to perform Work, decontamination procedures, necessary personnel and equipment, and type of equipment to be utilized.
- C.** The Contractor shall be required to provide appropriate personal protective equipment (PPE) for anyone who is working in an area either containing or suspected of containing a hazardous environment. This Work will include both individuals physically working in these areas and those directing the work of same. Contingencies for upgrading the level of protection for on-site workers will be identified in the Health and Safety Program and the Contractor shall have the necessary materials/equipment on hand to implement the level of protection upgrade in a timely manner. Payment for this level of upgraded protection if needed shall be paid for under the Risk Allowance.

COMPENSATION

- A.** The Work described under the Specification shall be incidental to the project and to the pay items listed in the Bid Form. No payment will be made under this item.

END OF SECTION

FULL TIME SAFETY SUPERVISORS

GENERAL

- A. The Contractor shall have full-time (all working hours/one each shift) on-site experienced Safety Supervisors, whose sole responsibility is on-site safety management. Work may not proceed without a Safety Supervisor present on-site.
- B. Safety Supervisors shall successfully complete RWP training and qualification.
- C. The Contractor shall within thirty (30) days after receipt of the award of the contract submit the resume of the qualifications and work experience of the designated Safety Supervisors proposed for assignment to the Project and evidence of their successful completion of Roadway Worker Protection training and qualification. No construction work shall begin until project Safety Supervisors have been approved by MassDOT.
- D. Safety Supervisors shall have a minimum of 5 years of experience as a construction safety supervisor, three of which include full-time on-site construction safety experience. Qualifications shall include:
1. •Thorough knowledge of construction safety and OSHA regulations
 2. •Successful completion of OSHA 30-hour Construction Safety and Health training course
 3. •Specialized safety training relevant to the project
 4. •Demonstrated ability in creating a safe work environment
 5. •Working knowledge of safety regulations and hazard control measures
 6. •Demonstrated ability to conduct safety training
 7. •Working knowledge of safety specific contract hazardous work procedures
 8. •Physically able to perform the job
 9. •Thorough knowledge of Title 49 Part 213 Track Safety Standards, Subparts A to F
 10. •Thorough knowledge of Title 49 Parts 219 and 243.
 11. •Thorough knowledge of Housatonic Railroad On-Track Safety Manual
 12. •Thorough knowledge of applicable Provisions of Title 49 CFR Part 214 Railroad Workplace Safety, as promulgated by the FRA, in particular:
 - Subpart B-Bridge Worker Safety Standards
 - Subpart C-Roadway Worker Protection
- E. Subpart D-Track Roadway Maintenance machines and Hi-Rail Vehicles The duties of the Safety Supervisors shall include maintenance of the Contractor's safety program, enforcement of safe practices, and the use of safety equipment and personal protective equipment, and other such activities as may be required by OSHA and MassDOT to maintain job safety and accident prevention. Safety Supervisors shall not be replaced, terminated, nor reassigned without the written approval of MassDOT. MassDOT shall be informed immediately of all safety representative resignations and replacements. A minimum transition period of two weeks shall occur to orient newly appointed safety supervisors. Vacancies in these positions must be filled within two weeks of the vacancy occurring. Safety Supervisors shall be assigned full-time to the contract and shall not be utilized concurrently on any other MassDOT contract or any other projects outside this MassDOT contract.

COMPENSATION

- A. The Work described under the Specification shall be incidental to the project and to the pay items listed in the Bid Form. No payment will be made under this item.

END OF SECTION

FULL TIME QUALITY CONTROL SUPERVISORS

GENERAL

- A.** The Contractor shall have full-time (all working hours/one each shift) on-site experienced Quality Supervisors, whose sole responsibility is on-site quality management, including management of the Contractor's Quality Program. Work may not proceed without a Quality Supervisor present on-site.
- B.** Quality Control supervisors must possess thorough knowledge of Title 49 Part 213 Track Safety Standards, Subparts A to F and maintain an active East Deerfield Yard Quality Control Plan prior to any work commencing in the field and lasting for the duration of the project.
- C.** The Contractor is responsible for controlling the quality of Work including work of its Subcontractors and suppliers and for assuring that the specified quality is achieved. The Contractor, Subcontractors and suppliers shall establish, maintain, and implement a written Quality Assurance Program (QAP). The Contractor shall ensure their Quality Assurance Program includes a responsibility to audit themselves plus all subcontracts, fabricators, and suppliers. The Contractor shall note that MassDOT reserves its right to also perform audits. The Program shall be tailored to the scope and complexity of the Work and shall include implementing procedures and inspection forms equal to or more detailed than those included at the end of this Section and throughout the Special Provisions.
- D.** The Contractor shall within thirty (30) days after receipt of the award of the contract submit their QAP, the resumes of the qualifications and work experience of the designated Quality Supervisors proposed for assignment to the Project and evidence of their successful completion of Roadway Worker Protection training and qualification. No construction work shall begin until the QAP and project Quality Supervisors have been approved by MassDOT. The Quality Supervisors shall have at least five (5) years of experience in implementing a quality control program on construction projects of similar size, scope and complexity. The Quality Supervisors shall be technical competent with the freedom and authority to make decisions without pressure or bias and shall have sufficient authority to ensure that quality requirements are consistently maintained.

COMPENSATION

- A.** The Work described under the Specification shall be incidental to the project and to the pay items listed in the Bid Form. No payment will be made under this item.

END OF SECTION

SITE PREPARATION & ENVIRONMENTAL MITIGATION COMMITMENTS

GENERAL

A. Work Included: This Section specifies the following items:

1. **Protection:** Protection from harm or defacement of trees and other vegetation or objects indicated or designated by Engineer to be preserved. The presumption shall be that any vegetated area not being regarded as part of the work will be preserved. Areas to be preserved shall include those areas shown on the drawings as undisturbed, any areas indicated by Engineer in pre-construction site visit, or any areas identified by other means. The use of plastic orange snow/construction fence shall be used along Pan Am Southern, LLC (Railroad) and MassDOT (Owner) ROW to delineate the limit of work on the ROW.
2. **Clearing, Grubbing and Trash Removal:** Clearing, grubbing, and disposing of all-natural materials within the limits of the work including vegetation, bushes, brush, trees, stumps, fallen timber, logs, roots, overhanging branches, and other similar materials. Removal and disposal of abandoned junk, trash, signs, fences, junk cars, bituminous concrete, concrete, metal, and debris of every nature to the satisfaction of the Engineer
3. **Removal and Salvage:** Removal, disposal, salvage, or other disposition of man-made materials within the limits of the work including precast concrete barriers, slabs and footings, pavements, curbs and gutters, sidewalks, headwalls, walls, and steps, utility service facilities, guardrail and posts, highway and street signs, fences, other miscellaneous structures and site improvements which interfere with construction as indicated by Engineer, and refuse, trash, and debris.
4. **Erosion Control System:** Placing of compost filter tubes for erosion and sediment control in areas shown on the drawings or as indicated by Engineer. Contractor shall control offsite transport of sediments.
5. **Transportation:** During the construction phase, MassDOT and Pan Am Southern, LLC will work with the construction contractor to minimize inconvenience to railroad operations by limiting the number of tracks that are out of service due to construction. Truck deliveries and material storage that typically uses the entrance where construction will be underway will be rerouted to the entrance further east.
6. **Hazardous Materials and Waste:** MassDOT, Pan Am Southern, LLC and the Contractor will ensure all material excavated as part of the track rehabilitation will be used for grading within the yard. All old crossties and timbers removed will be disposed of at an approved disposal site in accordance with EPA requirements.
7. **Water Quality:** MassDOT and Pan Am Southern, LLC will ensure that during construction, soil erosion and sedimentation control measures will be installed prior to the initiation of construction activities and maintained throughout construction. Compost filter tubes are proposed at the limits of disturbance along the edge of the intermodal transfer area to the tow of slope of railroad embankment. Once established, these measures will be monitored daily until construction activities are complete. The compost filter tube line will serve as the strict

limits of disturbance for the project. No alterations, including vegetative clearing or surface disturbance, will occur beyond this compost filter tube line. The limits of clearing, grading, and disturbance will be kept to a minimum within the proposed area of construction. All areas outside of these limits, as depicted on the project site plans, will be undisturbed by the project. After a significant rainstorm, all sedimentation control measures will be inspected and replaced if failed.

8. MassDOT will include requirements related to the soil erosion and sedimentation control measures and material disposal in the project construction contracts. A MassDOT resident engineer will be reviewing and overseeing project activities throughout the construction phase, including contractor compliance with the mitigation requirements including soil erosion and sedimentation control measures, and material disposal requirements.

If impacts to waters are anticipated as project progresses, grantee will obtain any required permits.

Any waste or excess materials will remain within the railroad ROW until disposal in appropriate, permitted facilities.

MassDOT will ensure all mitigation commitments included in this section are met.

SUBMITTALS

- A. Submit copies of requests for and certificates of severance of utility services to Engineer prior to start of site preparation work.

COMPOST FILTER TUBES

- A. Compost filter tubes: see section Erosion and Sediment Control of the Special Provisions.

PROTECTION

- A. Protect monuments, existing improvements, adjacent property, and facilities from damage.
- B. Contractor shall use all necessary precautions to prevent damage to Railroad and Owner or private property and to avoid hazardous exposure and personal injury to workers.
- C. Protect existing stone or concrete bounds and monumentation along property lines. Any disturbed bound or monumentation shall be reset by a Registered Land Surveyor at no additional cost to Railroad and Owner.

CLEARING AND GRUBBING

- A. Clear materials specified herein within the limits described and remove from the site. Remove stumps and roots completely in excavation areas.
- B. Do not start earthwork operations in areas where clearing and grubbing is not complete, except that stumps and large roots may be removed concurrently with excavation.
- C. Remove all material generated by clearing and grubbing and tree trimming and other related

operations off the site and dispose of in compliance with all applicable laws and regulations.

REMOVAL AND DISPOSAL

- A.** Remove entirely existing miscellaneous structures and site improvements that interfere with construction within the limits described or as designated by Railroad. Remove walls and masonry construction to a minimum depth of two (2) feet below existing ground level in areas where such items do not interfere with construction.
- B.** Remove all material generated by removal operations and other related operations off the site and dispose of in compliance with all applicable laws and regulations.
- C.** All removal and disposal must be done in accordance with applicable state and federal laws.
- D.** Any element to be removed that performs a safety function – such as fencing and signage – shall not be removed until its safety function is no longer necessary or has been replaced.
- E.** All materials, deemed not re-useable or salvageable, shall be properly disposed of.

SALVAGE

- A.** Salvage indicated material or material determined by Engineer to be suitable for reuse, including: grates, frames, other metal castings and miscellaneous parts of inlets and manholes; hydrants, fire alarm posts and boxes; metal light poles; sound pipe and valves; metal fencing; guard rail; highway and street signs and posts shall be delivered to Owner/Railroad.
- B.** Protect metallic coatings on salvaged items. Remove adhering concrete from salvaged items where required for disposal or directed by Engineer.
- C.** Repair, or replace with new material, salvaged material damaged or destroyed due to Contractor's negligence.
- D.** All items designated as "remove" and not relocated as part of this project, and determined to be in salvageable condition by Railroad, shall be delivered to the location specified in the General Notes Plan for each project location.

BACKFILL

- A.** Backfill and compact trenches and excavations resulting from work under this Section in accordance with Section Excavation of the Special Provisions.

COMPOST FILTER TUBES INSTALLATION

- A.** Compost filter tubes shall be positioned as indicated on the Drawings and as necessary to prevent off site movement of sediment produced by construction activities as directed by Engineer and as shown on the Drawings.
- B.** Install compost filter tubes according to Section Erosion and Sediment Control of the Special Provisions.

MAINTENANCE AND INSPECTIONS

A. Inspections: Contractor shall make a visual inspection of all sedimentation control devices at least once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas, Contractor shall promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly. Maintain stockpiles on site of siltation fence, straw bales or compost filter tubes, stakes, and repair kits so that repairs can be made without any delay in obtaining the necessary materials.

B. Maintenance:

1. Compost Filter Tubes

- a) Remove accumulated sediment in the vicinity of the compost filter tubes as required by Section Erosion and Sediment Control of the Special Provisions. Dispose of the sediment off site in compliance with all applicable laws and regulations.
- b) Replace damaged fabric with new fabric or patch it with section of new fabric with a two (2) foot minimum overlap. Anchor the new fabric in place.
- c) Make other repairs as necessary to ensure that the compost filter tubes are filtering all runoff directed towards it.
- d) Replace compost filter tubes when they are saturated with silt or otherwise damaged or ineffective. Dispose of used compost filter tubes off site in compliance with all applicable laws and regulations.

2. Silt Sack:

- a) Contractor to inspect and maintain silt sack inlet protection;
- b) Damaged silt sacks shall be replaced by Contractor as his own expense.

MEASUREMENT AND PAYMENT

A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

EROSION AND SEDIMENTATION CONTROL

GENERAL

- A. The terms sediment control barrier and or silt socks shall be interpreted to mean compost filter tube.
- B. The work under this item shall conform to the relevant provisions of Subsections 670, 751 and 767 of the Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition, Division II and shall include the furnishing and placement of a sediment control barrier. Sediment control barrier shall be installed prior to disturbing upslope soil.
- C. The purpose of the sediment control barrier is to slow runoff velocity and filter suspended sediments from storm water flow. Sediment barrier may be used to contain stockpile sediments, to break slope length, and to slow or prevent upgradient water or water off road surfaces from flowing into a work zone. Contractor shall be responsible for ensuring that barriers fulfill the intent of adequately controlling siltation and runoff.
- D. Twelve-inch diameter (after installation) compost filter tubes with biodegradable natural fabric (i.e., cotton, jute, burlap) are intended to be the primary sedimentation control barrier. Photo-biodegradable fabric shall not be used.
- E. For small areas of disturbance with minimal slope and slope length, the Engineer may approve the following sediment control methods:
 - 1. 9-inch compost filter tubes
- F. No straw wattles may be used. Additional compost filter tubes (adding depth or height) shall be used at specific locations of concentrated flow such as at gully points, steep slopes, or identified failure points in the sediment capture line.
- G. When required by permits, additional sediment barrier shall be stored on-site for emergency use and replacement for the duration of the contract.
- H. Sediment control barriers shall be installed in the approximate location as shown on the plans and as required so that no excavated or disturbed soil can enter mitigation areas or adjacent wetlands or waterways. If necessary to accommodate field conditions and to maximize effectiveness, barrier locations may be shifted with approval from the Engineer. Barriers shall be in place prior to excavation work. No work shall take place outside the barriers.

MATERIALS AND CONSTRUCTION

- A. Prior to initial placement of barriers, the Contractor and the Engineer shall review locations specified on the plans and adjust placement to ensure that the placement will provide maximum effectiveness.
- B. Barriers shall be securely in contact with existing soil such that there is no flow beneath the barrier.
- C. Compost filter tube
 - 1. Compost material inside the filter tube shall meet M1.06.0, except for the following: no peat, manure or bio-solids shall be used; no kiln-dried wood or construction debris shall be allowed; material shall pass through a 2-inch sieve; and the C:N ratio shall be disregarded.

2. Outer tube fabric shall be made of 100% biodegradable materials (i.e., cotton, hemp or jute) and shall have a knitted mesh with openings that allow for sufficient water flow and effective sediment capture.
3. Tubes shall be tamped, but not trenched, to ensure good contact with soil. When reinforcement is necessary, tubes shall be stacked as shown on the detail plans.

MAINTENANCE

- A. Maintenance of the sediment control barrier shall be per Section 670.60 of the Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition.
- B. The contractor shall inspect the sediment barrier in accordance with relevant permits. At a minimum, barriers shall be inspected at least once every 7 calendar days and after a rain event resulting in 0.25 inches or more of rainfall. Contractor shall be responsible for ensuring that an effective barrier is in place and working effectively for all phases of the Contract.
- C. Barriers that decompose such that they no longer provide the function required shall be repaired or replaced as directed. If the resulting berm of compost within the fabric tube is sufficiently intact (despite fabric decay) and continues to provide effective water and sediment control, barrier does not necessarily require replacement.

DISMANTLING & REMOVING

- A. Barriers shall be dismantled and/or removed, as required, when construction work is complete and upslope areas have been permanently stabilized and after receiving permission to do so from the Engineer.
- B. Regardless of site context, nonbiodegradable material and components of the sediment barriers, including photo-biodegradable fabric, plastic netting, nylon twine, and sedimentation fence, shall be removed and disposed off-site by the Contractor.
- C. For naturalized areas, biodegradable, natural fabric and material may be left in place to decompose on-site. In urban, residential, or other locations where aesthetics is a concern, the following shall apply:
 1. Compost filter tube fabric shall be cut and removed, and compost shall be raked to blend evenly (as would be done with a soil amendment or mulch). No more than a 2-inch depth shall be left on soil substrate.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

DEMOLITION

GENERAL

- A.** Work specified under this Section includes demolition work identified on the Contract Documents and identified as follows:
1. Demolition and removal of existing track and at-grade crossing material.
 2. If found, removing below-grade construction, such as old foundations or buried equipment.
 3. If found, disconnecting, capping or sealing, and removing site utilities.
 4. Salvaging items for reuse by MassDOT (Owner).

MATERIALS OWNERSHIP

- A.** Unless otherwise indicated, non-track related demolition waste becomes property of Contractor.
- B.** Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to MassDOT (Owner) and Pan Am Southern, LLC (Railroad) that may be uncovered during demolition remain the property of Owner.
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

SUBMITTALS

- A.** Schedule of Demolition Activities: Indicate the following:
1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 2. Temporary interruption of utility services and railroad yard operations.
 3. Shutoff and capping or re-routing of utility services.
- B.** Inventory: Submit a list of items to be removed and salvaged to Railroad and Owner prior to start of demolition.

PROJECT CONDITIONS

- A.** Track and at-grade crossing to be demolished will be free of all trains and coaches and their use discontinued before start of the Work.
- B.** On-site storage or sale of removed items or materials is not permitted.
- C.** Construction Access and Staging
1. Special attention shall be given to sequence demolition staging work so that operations are not

affected with respect to safety, operation and schedule.

2. All non-track materials removed as part of this demolition shall become the property of Contractor and are to be disposed of properly according to applicable local, State and Federal regulations, unless otherwise specified by Engineer.

COORDINATION

- A. Arrange demolition schedule so as not to interfere with Pan Am Southern, LLC, operations.
- B. Contractor must take steps to ensure that the operations will not interfere with access to the engine house.

PREPARATION

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving yard facilities as directed by Engineer.
 1. Arrange to shut off indicated utilities with utility companies.
 2. Cut off pipe or conduit a minimum of twenty-four (24) inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- B. Salvaged Items: Comply with the following:
 1. Clean salvaged items of dirt and demolition debris.
 2. Store items in a secure area until delivery to Railroad and Owner.
 3. Transport items to storage area designated by Railroad and Owner.
 4. Protect items from damage during transport and storage.

PROTECTION

- A. Existing Facilities: Protect adjacent walkways, yard track, platforms, loading docks, station or building entries, other building facilities, culverts, and other structures during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Railroad and Owner and Authorities Having Jurisdiction (AHJ).
 2. Provide temporary services during interruptions to existing utilities, as acceptable to Railroad and Owner and authorities having jurisdiction.
 3. Provide at least seventy-two (72) hours' notice to occupants of affected station or buildings if

shutdown of service is required during changeover.

- C. Temporary Protection: Erect temporary protection, where required by authorities having jurisdiction and as indicated.
1. Protect adjacent buildings and facilities from damage due to demolition activities.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 3. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 4. Provide protection to ensure safe passage of people around demolition area and to and from occupied portions of adjacent buildings and structures.
 5. Limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- D. Remove temporary barriers, protections, and bracing where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

DEMOLITION, GENERAL

- A. General: Demolish indicated items completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 2. Maintain fire watch during and for at least four (4) hours after flame cutting operations.
 3. Maintain adequate ventilation when using cutting torches.
- B. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, platforms or other adjacent occupied or used facilities without permission from Railroad, Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 2. Use water mist and other suitable methods to limit spread of dust and dirt.
- C. Explosives: Use of explosives is not permitted.

DEMOLITION BY MECHANICAL MEANS

- A. Salvage: Items to be salvaged are indicated on the Site Plan, Special Provisions, and as directed by the Railroad.

B. Below-Grade Construction: Demolish foundation walls and other below-grade construction that are within footprint of new construction and extending five (5) feet outside footprint indicated for new construction. Abandon below-grade construction outside this area.

1. Remove below-grade construction, including foundation walls, signal foundations, and footings, to at least depths indicated by Owner or Railroad.

C. Existing Utilities: Abandon existing utilities and below-grade utility structures.

SITE RESTORATION

A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.

B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

REPAIRS

A. Promptly repair damage to adjacent buildings, utilities, fences, culverts, or other structures caused by demolition operations.

DISPOSAL OF DEMOLISHED MATERIALS

B. Remove demolition waste materials from Project site and legally dispose of them in location acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

C. Do not burn demolished materials.

REUSE OF SALVAGING ITEMS

A. All existing track material should be removed and handled as directed on the Contract Drawings and Special Provisions.

MEASUREMENT AND PAYMENT

B. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

EXCAVATION AND BACKFILL

GENERAL

- A.** Work Included: This Section specifies the following items.
1. Preparing subgrades for subballast, ballast and track.
 2. Excavating, backfilling and compacting for subballast, ballast and track.
 3. Disposal of excess excavated material will be along the railroad right-of-way within five (5) miles of the work site at a location(s) designated by Engineer.
 4. Placement and compaction of ballast. The placement of subballast or ballast for the base course shall be in accordance with the Contract Drawings, AREMA Recommended Practices, and the MassDOT MW-1 except as modified herein. Crushed stone shall be installed only in areas directed by Engineer.
 5. Placement of flowable compacted fill in utility trenches and other areas as directed by Engineer.

RESPONSIBILITY OF CONTRACTOR

- A.** Contractor shall be responsible for adhering to regulations, specifications, and recognized standard practices related to soil and rock excavation during excavation and removal activities. MassDOT (Owner) and Pan Am Southern, LLC (Railroad) will not be responsible at any time for Contractor's violation of pertinent state or federal regulations or endangerment of laborers or others.
- B.** It is the responsibility of Contractor to protect all existing utilities within the Contract Limits. Coordination with the various utility companies shall be required for the protection of these lines as stated within these Contract Specifications.
- C.** Contractor shall be responsible for all costs associated with protection, repair, or relocation of utility lines within the Contract Limits.

PREPARATION

- A.** Protect structures, track structure, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by excavation operations.
- B.** Preparation of subgrade including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section Site Preparation of the Special Provisions.
- C.** Protect and maintain erosion and sedimentation controls when needed, which are specified in Section Site Preparation and Section Erosion and Sedimentation Control of the Special Provisions, during excavation operations.

EXPLOSIVES

- A.** Explosives: Do not use explosives.

EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include bituminous and cement concrete sidewalks and roadways, bricks and cobbles, old ballast, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

STORAGE OF SOIL MATERIALS

- A. Temporary Stockpiling of excavated old ballast and soil material within the yard in the area designated by Railroad is acceptable until material is reused or disposed of along railroad Right-of-Way. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- B. Stockpile soil materials away from edge of excavations.
- C. Do not store within drip line of remaining trees.

MATERIAL TRANSPORT

- A. All soils transported on and along track shall be loaded by Contractor into properly licensed and permitted hi-rail vehicles.
- B. Hi-rail trucks used to transport the materials shall be constructed and loaded as to prevent any of the load from dropping, sifting, leaking, or otherwise escaping during transport. All trucks shall be equipped with tarps or other substantial type covers which shall be used to prevent any materials from spilling during transport.

EMBANKMENT FILL

- A. Existing excavated materials shall be used as embankment fill.
- B. Plow, scarify, bench, or break up railroad Right-of-Way sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Where possible, place excavated material on subgrades free of mud, frost, snow, or ice.

GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

- B.** Site Grading: Slope grades to direct water away from track and to prevent ponding. Finish subgrades to required elevations.

DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A.** Disposal: Contractor shall remove unsatisfactory waste material from excavated material, including trash, and debris, and legally dispose of it off the site.
- B.** Surplus: If surplus of satisfactory excavated material exists, Contractor is to dispose of the material within the railroad Right-of-Way as directed by Engineer.

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

GRAVEL BORROW

GENERAL

- A. This Section specifies furnishing and placing gravel borrow material for track subballast.

QUALITY CONTROL

A. Tolerances

1. Variation of compacted subbase and base courses from indicated cross-section elevation: plus or minus 3/8 inch.
2. Longitudinal irregularity of compacted subbase and base courses, under a ten-footline:
 - a. Subbase under gravel base course: 3/4 inch maximum;
 - b. All other: 3/8 inch maximum.

B. Methods of Testing

1. Sieve Analysis: ASTM C136;
2. Material Passing No. 200 Sieve: ASTM C117;
3. Resistance to Abrasion (Percentage of Wear): ASTM C131 and C535 as applicable.
4. Moisture-Density Relationship: ASTM D698, Method C;
5. In-Place Density: ASTM D2922.

PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Provide gravel borrow at the point of spreading uniformly mixed with sufficient moisture content to obtain the required compaction.

GRAVEL SUBBASE AND BASE COURSES

- A. General: Gravel Borrow shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings, and deleterious materials.
- B. Gradation requirements for gravel shall meet MassDOT standard M2.01.7 Dense Graded Crushed Stone for Sub-base and shall conform to the following:

SIEVE DESIGNATION	PERCENT PASSING, BY WEIGHT
2 inch	100
1 ½ inch	70 – 100
¾ inch	50 - 85
No. 4	30 – 55
No. 50	8 – 24
No. 200	3 - 10

- C. Spread and compact gravel in layers not exceeding four inches for Type B gravel, compacted measurement.
- D. Compact each layer to 95 percent of the maximum dry density of the material at optimum moisture content, except as specified in Article 3.03 herein.
- E. Remove from the subbase or base course any stone with a dimension greater than that permitted for the type of gravel specified.
- F. Remove, replace, and re-compact any gravel which, after being rolled, does not form a satisfactory solid, stable foundation.

FIELD QUALITY CONTROL

- A. Moisture-Density Relationship. If the material retained on the No. 4 sieve is 50 percent or more of the total sample, ASTM D698 will not apply, and the material shall be compacted as directed by the Engineer.
- B. In-Place Density. Maintain the specific gravity of the in-place material by determining the number of passes of a roller to produce a constant and uniform density, after conducting a series of tests using the nuclear method (ASTMD2922).

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

SUBBASE AND BASE COURSES

GENERAL

- A.** This Section specifies furnishing and placing gravel borrow and dense-graded crushed stone for subbase and base courses.

QUALITY CONTROL

A. Tolerances

- 1. Variation of compacted subbase and base courses from indicated cross-section elevation: plus or minus 3/8 inch.
- 2. Longitudinal irregularity of compacted subbase and base courses, under a ten-footline:
 - a. Subbase under gravel base course: 3/4 inch maximum;
 - b. All other: 3/8 inch maximum.

B. Methods of Testing

- 1. Sieve Analysis: ASTM C136;
- 2. Material Passing No. 200 Sieve: ASTM C117;
- 3. Resistance to Abrasion (Percentage of Wear): ASTM C131 and C535 as applicable.
- 4. Moisture-Density Relationship: ASTM D698, Method C;
- 5. In-Place Density: ASTM D2922.

PRODUCT DELIVERY, STORAGE, AND HANDLING

- A.** Provide gravel borrow and crushed stone at the point of spreading uniformly mixed with sufficient moisture content to obtain the required compaction.

GRAVEL SUBBASE

- A.** See specification Section Earthwork, Soil Material, Gravel Borrow.

GRAVEL BASE COURSE

- A.** See specification Section Earthwork, Soil Material, Processed Gravel for Subbase.

DENSE GRADED CRUSHED STONE SUBBASE

- A.** General: A mixture of crusher-run coarse aggregates of crushed stone or gravel and fine aggregates of natural sand or stone screenings, uniformly mixed with a pre-determined amount of water, and free from clay, loam, or other deleterious material.

B. Gradation

SIEVE DESIGNATION	PERCENT PASSING, BY WEIGHT
3 inch	100
1-1/2 inch	70 - 100
3/4 inch	50 - 85
No. 4	30 - 55
No. 50	8 - 24
No. 200	3 - 12

- C. Coarse Aggregate: Hard durable particles of stone or gravel which will not break up when alternately frozen or thawed or wetted and dried, having a maximum percentage of wear of 42, and consisting of a minimum of 75 percent of fractured particles. A fractured particle is one which has at least one fractured face and in which the total area of face fracture exceeds 25 percent of the maximum cross sectional area of the particle.

GRAVEL SUBBASE AND BASE COURSES

- A. Spread and compact gravel in layers not exceeding four inches compacted measurement.
- B. Compact each layer to 95 percent of the maximum dry density of the material at optimum moisture content, except as specified herein.
- C. Remove from the subbase or base course any stone with a dimension greater than that permitted for the type of gravel specified.
- D. Remove, replace, and recompact any gravel which, after being rolled, does not form a satisfactory solid, stable foundation.

DENSE GRADED CRUSHED STONE SUBBASE

- A. Spread dense graded crushed stone in layers from self-spreading machines equipped with automatic grade-controlled equipment. Use power graders or conventional self-spreading vehicles only with the prior written approval of the Engineer.
- B. Maintain suitable watering devices at the source of supply and on the project for use as directed by the Engineer to prevent segregation in transit and to obtain proper density and stability of the mixture.

FIELD QUALITY CONTROL

- A. Moisture-Density Relationship. If the material retained on the No. 4 sieve is 50 percent or more of the total sample, ASTM D698 will not apply, and the material shall be compacted as directed by the Engineer.

- B.** In-Place Density. Maintain the specific gravity of the in-place material by determining the number of passes of a roller to produce a constant and uniform density, after conducting a series of tests using the nuclear method (ASTMD2922).

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

HOT MIX ASPHALT (HMA) PAVEMENT

GENERAL

- A. Work Included: This Section specifies the installation of hot mix asphalt pavement on prepared subgrade or aggregate subbase or base course, or existing pavement, to the lines, grades, compacted thickness, and cross sections indicated.
- B. Contractor shall furnish HMA pavements as reference in the Special Provisions.

QUALITY ASSURANCE

A. Job Mix Formulae

1. The composition limits specified in Table 02513-C at the end of this Section are master ranges of tolerances of materials in general. In order to obtain standard texture, density, and stability, furnish to Engineer for approval a specific job mix formula for the particular uniform combination of materials and sources of supply to be used on this project. Establish the job mix formula in accordance with the requirements of Bituminous Material Standards defined in the Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition, Division III, Section M3 – Bituminous Material.
2. Should a change of sources of materials be made, furnish a new job mix formula for approval before using the new material.
3. Two or more job mix formulae may be approved for a particular plant; however, only material conforming to one job mix formula will be permitted to be used on any given day. If Contractor elects to furnish hot mix asphalt from more than one plant, the job mix formulae shall be adhered to by all plants.
4. When unsatisfactory results or other conditions make it necessary, Engineer may establish new job mix formulae.

B. Methods of Sampling and Testing

1. Performance Graded Asphalt Binder:
 - a. Viscosity: ASTM D4402.
 - b. Dynamic Shear: AASHTO TP5.
 - c. Flash Point: AASHTO T48.
 - d. Rolling Thin Film Over Test: AASHTO T240.
 - e. Mass Change %: AASHTO T240.
 - f. PAV Aging: AASHTO PP1.
 - g. Specific Gravity: ASTM D 3142.
 - h. Creep Stiffness and M-Value: AASHTO TP1.

2. Cutback Asphalt:
 - i. Viscosity: ASTM D 2170.
 - j. Flash Point: ASTM D 3143.
 - k. Distillation: ASTM D 402.
 - l. Water in Asphalt: AASHTO T55.
 - m. Specific Gravity: AASHTO T228.
3. Emulsified Asphalt: ASTM D 977.
4. Joint and Crack Sealants, Type I:
 - a. General: ASTM D 6690
 - b. Testing: ASTM D 36 and ASTM D 5329.
5. Mineral Aggregates and Filler:
 - a. Sieve Analysis, Aggregates: ASTM C 136.
 - b. Sieve Analysis, Mineral Filler: ASTM D 242.
 - c. Unit Weight of Aggregate: ASTM C 29.
 - d. Material Passing No. 200 Sieve: ASTM C 117.
 - e. Abrasion of Coarse Aggregate: ASTM C 131.
 - f. Soundness of Aggregates: ASTM C 88.
 - g. Specific Gravity, Coarse Aggregate: ASTM C 127.
 - h. Specific Gravity, Fine Aggregate: ASTM C 128.
 - i. Specific Gravity, Mineral Filler: AASHTO T100 to T133
6. Hot Mix Asphalt Mixtures:
 - a. Density: AASHTO T166.
 - b. Compaction: ASTM D 2950.

C. Composition and Compaction Acceptance Tests

1. Where plant inspection is maintained, hot mix asphalt will be acceptable for use if the specified tests from samples obtained at the production plant indicate conformance to the approved job mix formula.
2. For determination of pavement density, perform in-place density testing by the Nuclear Density Method, ASTM D 2950. The number of tests shall be determined by the MassDOT QA lab.
3. MassDOT (Owner) and Pan Am Southern, LLC (Railroad) may also require bituminous cores to determine in- place density.

MATERIALS

- A.** Performance Graded Asphalt Binder: AASHTO M320, grade as indicated, except that the requirements listed under Table 02513-A shall apply.
- B.** Cutback Asphalts, Medium-Curing: AASHTO M82, grade as indicated.
- C.** Bituminous Emulsions
 - 1. Asphaltic Emulsions: AASHTO M140, grade as indicated. Use grade RS-1 for prime coat or tack coat.
 - 2. Cationic Emulsified Asphalt: AASHTO M208, grade as indicated.
 - 3. Clay-Type Asphalt Emulsion: A mineral colloid type of asphalt emulsion containing no chemical emulsifiers and meeting the following requirements:
 - a. Percent water, per AASHTO T59: 40 to 55
 - b. Percent residue by evaporation, per AASHTO T59: 45 to 60
 - c. Percent ash in residue, per ASTM D1010: 5 to 15
 - d. Curing time, per Massachusetts DPW standard test procedures: firm set in 48 hours maximum
 - e. Resistance to water, per Massachusetts DPW standard test procedures: no re-emulsification.
 - 4. Protective Seal Coat Emulsion: a homogeneous emulsion consisting of coal tar pitch dispersed in water by means of a mineral colloid, containing no asphaltic materials or chemical emulsifiers; capable of overcoming any separation or coagulation of its components by moderate stirring; meeting the following requirements:
 - a. Percent Water, per AASHTO T59: 50 maximum
 - b. Percent non-volatile matter, per ASTM D1010: 48 minimum
 - c. Percent ash in non-volatile matter, per ASTM D1010: 20 to 45
 - d. Percent solubility on non-volatile matter in carbon disulfide: 40 minimum
 - e. Resistance to water, per ASTM D466: no blistering, loss of adhesion, or re-emulsification
 - f. Resistance to petroleum solvents, per ASTM D466 with solvents substituted for water: no penetration or loss of adhesion.
- D.** Asphalt Anti-Stripping Additive
 - 1. General: An additive to asphalt to assist in the coating of wet aggregate and to increase the resistance of the bituminous coating to stripping in the presence of water; shall be chemically inert to asphalt (heat stable) and when blended with asphalt shall withstand storage at a temperature of 400°F for extended periods without loss of effectiveness.
 - 2. Composition: An organic chemical compound free from inorganic mineral salts or inorganic mineral soaps, containing no ingredient harmful to the bituminous material or to the operator, and not appreciably altering the specified characteristics of the bituminous material; chemically inert

to asphalt.

3. Heat Stability: The compound shall retain its effectiveness after heating in asphalt according to the prescribed method for 24 hours at 350°F.
4. Resistance to Stripping. Treated Bitumen shall coat wet aggregate and shall retain at least 90 percent of the coating after 24 hours of static immersion. There shall be no loss of the retained coating after the immersion has been extended to one week.

E. Coarse Aggregate

1. General: Clean, crushed rock consisting of the angular fragments obtained by breaking and crushing shattered natural rock, free from a detrimental quantity of thin or elongated pieces, and free from dirt or other objectionable materials; having a percentage of wear of not more than 30; surface dry and having a moisture content of not more than 0.5 percent after drying. The use of crushed gravel stone will not be permitted.
2. Gradation: Blended from the stone sizes listed in Table 02513-B. Each stone size shall meet its respective gradation as tabulated in Table 02513-B. Sizes other than primary stone sizes may be used providing they are separately introduced on the cold feed belt and can be shown to be an improvement to the mix. Such usage shall require the prior written approval of Engineer.

F. Fine Aggregate

1. General: Natural or stone sand or a blend thereof; or a blend of natural sand and stone screenings, or a blend of stone, sand and stonescreenings;
 - a. Natural Sand: Clean, inert, hard durable grains of quartz or other hard durable rock, free of loam, clay, surface coatings or other deleterious substances.
 - b. Stone Sand: Process from the stone screenings, of either a primary or secondary crusher to produce a product that when used alone or blended in any combination with natural sand shall meet the specified gradation requirements. Wash plant or other equipment used for processing stone sand shall be as accepted by Engineer.

G. Mineral Filler

1. Portland cement, limestone dust, hydrated lime, stone float, or stone dust, 100 percent passing a No. 50 sieve and not less than 65 percent passing a No. 200 sieve. Stone dust shall be produced from crushed ledge stone and shall be the product of a secondary crusher so processed as to deliver a product of uniform grading.
2. Reclaimed Asphalt Pavement (RAP) shall consist of the material obtained from the highways or streets by crushing, milling, or planing existing hot mix asphalt pavements. This material shall be transported to the hot mix asphalt production facility yard and processed through an appropriate crusher so that the resulting material will contain no particles larger than the maximum aggregate size of the hot mix asphalt mixture in which it will be used. The material shall be stockpiled on a free draining base and kept separate from virgin aggregates. The material contained in the RAP stockpiles shall have a reasonably uniform gradation from fine to coarse and shall be protected from accumulation of excessive moisture and shall not be contaminated by foreign materials. The use of RAP will be permitted provided that the end product is in conformance with the approved job-mix formula. The proportion of RAP to virgin aggregate for

base course mixtures and intermediate course mixtures shall be limited to a maximum of 40% for drum mix plants and 20% for modified batch plants. The maximum amount of RAP for surface course mixtures shall be 10%.

3. Joint and Crack Sealants shall consist of a hot applied elastomeric crack/joint sealant for asphaltic concrete pavements. Sealant shall be melted via a kettle or melter constructed as a double boiler. The space between the inner and outer shells filled with high flash point heat transfer oil or other indirect heating means. The kettle to be used must have constant agitation any time material is over three hundred (300) degrees F. The kettle must have temperature-monitoring capabilities. Roofing kettles or other direct fired melters are not acceptable for these materials.

HOT MIX ASPHALT (HMA) MIXES

- A. Provide Hot Mix Asphalt mixtures composed of mineral aggregate, mineral filler if required bituminous material, and anti-stripping additive if required, proportioned as specified herein to conform to the composition by weight tabulated in Table 02513-C and in the approved job mix formulae.
- B. Use sufficient mineral filler to correct any deficiencies in grading of fine aggregate.
- C. Anti-stripping additive, if required, shall be incorporated and thoroughly dispersed in the bituminous material in an amount equal to the percent by weight established by Contractor's Materials Testing Laboratory and approved by Railroad or Owner. This percent will be based on the efficiency of the additive as determined by laboratory tests. No modification of the established additive concentration will be permitted because of the use of hydrophobic aggregate. Railroad and Owner reserve the right to establish as minimum the percentage of additive required. Blend additive in the refinery with the asphalt in the presence of the Inspector.
- D. The percentages stated herein and in Table 02513-C are stated as proportional percentages of integral total aggregate for the mix.
- E. Furnish Intermediate Course, with anti-stripping additive, for use as protective (bottom) course of pavements where indicated.
- F. Furnish Patching Mix with one percent hydrated lime.

PLANT REQUIREMENTS

- A. General: The plant used in the production of hot mix asphalt shall comply with AASHTO M156, subject to the following additional requirements:
 1. Plant Scales
 - a. Scales for measuring materials into the mixtures shall be springless dial type and shall be of standard make and design. Scale graduations and markings shall be plainly visible, and dials shall be so located as to be easily readable from the operator's normal work station by direct sight or through repeating dials. Parallax effects shall be reduced to the practical minimum with clearance between indicator index and scale graduations not exceeding 0.06 inch. Dials shall be equipped with a full complement of adjustable index pointers for marking the required weight of each material to be weighed into the batch.

- b. Digital scales will be either electric/mechanical (load cell and lever system) or fully electronic (all load cell). Digital indicators shall be of standard make and design. Scale graduations and capacity shall be plainly visible on the faceplate of the indicator, if panel mounted. If the unit is of desktop or wall-mount variety, a data sticker shall be located on the side of the unit. Indicators must be located as to be easily readable from the operator's normal workstation by sight.
- c. Bitumen scales shall be accurate to 0.05 percent, have minimum graduations not greater than 0.025 percent, and shall be readable and sensitive to 0.0125 percent or less. Scales for any weigh box or hopper shall be accurate to 0.5 percent, have minimum graduations not greater than 0.5 percent and shall be readable and sensitive to 0.25 percent or less. The preceding percentages for both bitumen and aggregate scales are based on the maximum total batch weight of the mixtures.

2. Testing of Scales

- a. All plant scales, including truck scales, shall be tested at the expense of Contractor by a competent scale technician as follows:
 - 1) Annually prior to use in Railroad and Owner work.
 - 2) At intervals of not more than 90 calendar days.
 - 3) At any time ordered by Engineer.
- b. A cradle or platform approved by Engineer for each scale and at least ten standard fifty-pound test weights shall be provided for testing scales whenever directed by Engineer. The use of a set of test weights for two or more plants will be permitted only when they can be made readily available with no more than an hour's notice.

3. Automatic Batching

- a. Automatic proportioning: Batch type mixing plants shall be equipped with approved automatic proportioning devices. Such devices shall include equipment for accurately proportioning batches containing the various components of the mixture by weight in the proper sequence and for controlling the sequence and timing of mixing operations. Interlocks shall be provided which will hold or delay the automatic batch cycling whenever the batched quantity of any component is not within the specified weight tolerance, when any aggregate bin becomes empty or when there is a malfunction in any portion of the control system. The weight setting and time controls shall be so equipped that they may be locked when directed by Engineer.
- b. Automatic Recordation: Recordation equipment shall be provided. Each recorder shall include an automatic printer system. The printer shall be so positioned that the scale dial and the printer can be readily observed at one location by the plant inspector. Use of repeating dials or an additional printer to achieve this condition will be permitted. The printer shall print, in digital form, on a delivery ticket the following data:
 - 1) Date mixed.
 - 2) Time of batching.
 - 3) Tare weight of aggregate weigh box.
 - 4) Tare weight of bitumen weigh bucket.
 - 5) Accumulative weights as batched for each bin. (Total of last bin will be aggregate total).
 - 6) Weight of bitumen.

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- 7) Total weight of mix in truck (Pay weight). This printed ticket shall be used in lieu of truck scale weights.
 - c. Equipment Failure. If at any time the automatic proportioning of recording system becomes inoperative, the plant will be allowed to batch materials manually for a period not in excess of two working days. Manual batching for longer periods will require written permission of Engineer.
 - d. Batching Controls
 - 1) The batching controls shall meet the following delivery tolerances with respect to the various components weighed in each batch:
 - a. Tare Weight of Aggregate Weigh Box: + 0.5 percent of total batch weight.
 - b. Tare Weight of Bitumen Weigh Bucket: + 0.1 percent of total batch weight.
 - c. Individual Aggregate Components: + 1.0 percent of total batch weight.
 - d. Combined Aggregate Components: + 1.5 percent of total batch weight.
 - e. Mineral Filler: + 0.5 percent of total batch weight.
 - f. Asphalt: + 0.1 percent of total batch weight.
 - 2) The total weight of the batch shall not vary more than plus or minus 2 percent from the theoretical design weight.
 - 3) If directed by Engineer, provisions shall be made for locking controls against tampering.
4. Plant Laboratory
- a. A building shall be furnished at the site of the producing plant suitable for the housing and use of equipment necessary to carry on the various tests required and for recording and processing test results. This building shall be for the exclusive use of Engineer or his representatives for testing and recording purposes.
 - b. The building shall have a minimum floor area of 100 square feet; the least dimension to be 6 feet. Windows and doors shall be adequately screened; satisfactory lighting, heating and water shall be supplied. A table, chairs, desk and work bench shall be provided. Provision shall be made for the safe performance of extraction test determinations by providing an adequate exhaust fan and suitable means of disposing of used solvent and other waste.
 - c. If Engineer permits, the plant laboratory may be part of another building in which case it shall be entirely partitioned off from the remainder of such building.
 - d. Testing equipment shall be furnished as follows and installed in the building for use in testing the materials and mixtures supplied by the Plant for the work:
 - 1) One Approved Rotary Extractor.
 - 2) One Coarse Aggregate Sieve Shaker, power driven with a minimum clear sieve area of 324 square inches. The shaker shall be attached to a firm anchorage.
 - 3) One each of the following square opening screens for coarse aggregate shaker: 2 inch, 1-1/2 inch, 1 inch, 3/4 inch, 1/2 inch, 1/8 inch, No. 4 and No. 8.
 - 4) One Fine Aggregate Sieve Shaker, power driven and independent of the coarse aggregate shaker, for eight inch minimum diameter sieves.
 - 5) One each of the following standard eight inch minimum diameter square opening sieves:
-

-
- 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, No. 50, No. 100, and No. 200, with pan and cover.
- 6) One Sample Splitter with a minimum capacity of one cubic foot. It shall be the clam shell type and the chute width shall be adjustable from a minimum of 1/2 inch up to 2 inches.
 - 7) One Solution Balance, 20 kilogram capacity, weighing directly to 1 gram, with two weighing beams and a taring beam; tare capacity to be 2 kilograms; weighing beams to read 1000 grams by 100 gram divisions and 100 grams by 1 gram division. Additional matching weights (one 1 kg., two 2 kg., one 5 kg., and one 10 kg.) shall be provided to fulfill the capacity of 20 kilograms. The platform to be 11 inches in diameter.
 - 8) One Approved Scale with a minimum capacity of 2000 grams and with a sensitivity of 0.50 grams
 - 9) Two Approved Dial Type Thermometers, range 50°F. to 500°F.
 - 10) One Approved Hot Plate
- e. Approval of a plant will be contingent upon approval of the aforementioned requirements for Plant Laboratory, including the building and appurtenances, furnishings, facilities including heat, light, power and water, the testing equipment, and any other incidentals.
5. Sampling facilities. Adequate and convenient sampling facilities shall be provided to allow the Inspector to obtain representative samples from the full width and depth of the discharge area of each aggregate bin. The sampling tray shall be structurally supported during the sampling operation. Access to the sampling facilities shall be provided requiring no more difficulty than that to climb a ladder leading to a secure platform with railings.
6. Inspection. Engineer or his authorized representative shall have access at any time to all parts of the plant for:
- a. Inspections of the conditions and operations of the plant.
 - b. Confirmation of the adequacy of the equipment in use.
 - c. Verification of the character and proportions of the mixture.
 - d. Determination of temperatures being maintained in the preparation of the mixtures.
 - e. Inspection of incidental related procedures.

PREPARATION OF MIXTURES

- A.** Preparation of Asphalt Cement: Place bituminous materials in the mixer at a temperature between 275°F and 375°F, as directed.
- B.** Preparation of Mineral Aggregate: Thoroughly dry and heat aggregates before placing them in the mixer. Control the temperature of the aggregates so that the temperature of the complete mixture shall be within the range specified in paragraph C. below.
- C.** Preparation of Hot Mix Asphalt Mixtures: Combine the heated and dried aggregates and mineral filler and convey them into the mixer in the proportionate amounts of each size required to meet the job mix formula. After these materials have been mixed for the specified dry-mixing time, add the asphalt cement and mix for the specified wet-mixing time. Measure asphalt cement by weight or by an

approved metering device. The temperature of the mixture when discharged shall be between 275°F and 325°F.

TRANSPORTATION AND DELIVERY OF MIXTURES

- A. Vehicles for transportation of mixtures from the plant to the jobsite shall be clean of all foreign materials, tight, and evenly and lightly coated with a suitable thin oil or approved soap solution. No excess of lubricant shall be allowed to accumulate in low spots in the body. When necessary, vehicles shall be insulated so that the mixture is delivered for placement at the proper temperature.
- B. Arrange dispatching of trucks from the plant so that all material which is delivered to the jobsite during any day shall be placed and shall have received final compaction before nightfall of the same day, unless satisfactory artificial light is provided.
- C. Do not transport mixtures such a distance that segregation of the ingredients takes place or that any crust is formed on the top, bottom, or sides of the mixture which will not crumble or flatten out when the mixture is dumped, or which might otherwise be deleterious to the mixture in place on the work.
- D. During transportation of the mixture from the plant to the spreader at the jobsite, keep the mixture fully covered at all times with canvas or other suitable material of sufficient size and thickness to furnish complete protection.
- E. Deliver the mixture to the jobsite at a temperature governed by the air temperature in the shade and away from artificial heat, as follows with a tolerance of plus or minus 20°F:

1. Normal Layered Construction:

Air Temperature	Delivered Mix Temperature
35°F.	300°F.
40°F.	290°F.
65°F.	280°F.
90°F. and Over	275°F.

2. Deep Lift Paving (3 inches and over), Base and Binder Courses only:

Air Temperature	Delivered Mix Temperature
35°F.	280°F.
40°F.	270°F.
65°F. and over	260°F.

PRIME COAT (OR TACK COAT)

- A.** Where an existing hardened surface is used as a base for new pavement, or elsewhere where the surface to receive hot mix asphalt pavement is, in Engineer's judgment, unsatisfactory to receive the pavement, give the surface a prime coat of bituminous material of the kind and grade indicated or directed. Where unsatisfactory conditions, requiring application of prime coat, are due to the fault of Contractor, provide the prime coat at no additional expense to Railroad and Owner.
- B.** Clean the existing surface of all foreign matter and loose material before applying prime coat. Apply the prime coat by mechanical means at the rate indicated or directed.

SPREADING AND FINISHING**A. General**

- 1. Place hot mix asphalt pavement in courses as indicated on the Contract Plans and Special Provisions.
- 2. When an existing surface or new base, upon which the bottom course is to be laid, contains unsatisfactory irregularities, in Engineer's judgment, eliminate such irregularities by placing and compaction of mixture, as to furnish a surface with true contour and grade before placing any specified bottom course.
- 3. Paint thoroughly the contact surfaces of curbing, manholes, catch basins, and other appurtenant structures in pavement, with a thin coating of bitumen immediately prior to placing any mixture against them.
- 4. Give special attention to proper testing of the surface of each course with a straightedge. Finished surfaces shall be even and uniform throughout.
- 5. Remove and replace with new mixture any mixture which becomes loose or broken, mixed with dirt, or defective in any way. Finish and compact the repaired area to conform to the surrounding area. Remove and replace areas of one square foot or more showing an excess of bitumen.
- 6. No mixture shall be placed unless the breakdown and intermediate rolling can be completed by the time the material has cooled at 175°F, provided that the density of the pavement attains at least 95 percent of the laboratory compacted density.

B. Spreading and Finishing Equipment

- 1. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture to line, grade, width, and crown by means of fully automated controls for both longitudinal and transverse slope.
- 2. The pavers shall be equipped with hoppers and distributing screws of the reversing type to place the mixture evenly in front of adjustable screeds. They shall be equipped with a quick and efficient steering device and shall have reverse as well as forward traveling speeds.

3. The pavers shall employ mechanical devices such as equalizing runners, straight edge runners, eveners or other compensating devices to adjust the grade and confine the edges of the mixture to true lines. They shall be capable of spreading the mixture without segregation in layers to the depths and widths required. They shall be equipped with blending or joint leveling devices for smoothing and adjusting all longitudinal joints between adjacent strips or courses of the same thickness.
4. The screed shall be adjustable for profile and shall have an indicating level attached.
5. An approved device will be required for heating the screed to the temperature required for the laying of the mixtures without pulling or marring.
6. The term "screed" includes any "strike-off" device operated by cutting, crowding, or other practicable action, which is effective on the mixtures at permissible workable temperatures without tearing, shoving, or gouging and which produces a finished surface of the evenness and texture required.
7. The pavers employed on projects requiring in excess of 15,000 tons shall operate by use of a sensing grid for operation to a stringline and matching shoe for joints.
8. The paver shall be provided with a "ski" which may be employed for paving on the previously laid hot mix asphalt base, or binder as directed or permitted by Engineer.
9. The paver employed on deep lift construction shall be capable of satisfactorily feeding the mix without intermittent stopping during the discharge of the mix from the trucks into the paving machine.
10. If during construction, it is found that the spreading and finishing equipment in use leaves tracks or indented areas or produces other permanent blemishes in the pavement which are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued and other satisfactory spreading and finishing equipment shall be provided.
11. Complete all compaction rolling before the hot mix asphalt temperature drops below 185°Fahrenheit.

C. Machine Spreading

1. Deposit mixtures in the approved mechanical spreader, spread immediately, and strike off in a uniform layer to the full width required and to such depth that each course, when compacted, shall have the required thickness and shall conform to the indicated grade and cross section contour.
2. Deposit mixture in the center of the hoppers, exercising care to avoid overloading and spilling. Operate the pavers, while the mixture is being spread, at a speed which will produce a uniform surface texture.
3. Immediately after each course is screeded and before roller compaction is started, check the surface, adjust any irregularities, remove accumulation from the screed by rake or lute, and remove and replace any unsatisfactory spots in the course. Correct irregularities in line and grade along outside edges by addition or removal of material before the edge is rolled. Indiscriminate casting of mix on the new screeded surface, where irregularities are not evident, will not be permitted.

4. All edges shall be true and uniform.

D. Hand Spreading

1. Spreading by hand methods will be permitted only for particular locations in the work which because of irregularity, inaccessibility or other unavoidable obstacles do not allow mechanical spreading and finishing.
2. When hand spreading is permitted, place the mixture by dumping on approved steel dump sheets outside the area upon which it is to be spread; or by other approved methods. Immediately thereafter, distribute the mixture into place by means of hot shovels, and spread it with hot rakes or lutes in a loose layer of uniform density and correct depth. Tines of the rakes shall be not less than 1/2 inch longer than the loose depth of mixture and spaces between tines shall be not less than 1 inch.
3. Do not dump loads faster than they can be properly handled by the shovelers, and do not distribute the dumped load faster than it can be properly handled by the rakers. Rake carefully and skillfully to avoid segregation and so that, after the first passage of the roller over the raked mixture, no back patching will be necessary.

COMPACTION

A. Compaction Equipment

1. After the paving mixture has been properly spread, initial compaction shall be obtained by use of power rollers of approved design and weight per inch width of roller. The rollers shall be steel-wheeled supplemented with pneumatic-tired rollers where required, or where permitted, vibratory rollers.
2. Steel wheel rollers for initial and intermediate rolling shall have a weight of not less than 240 pounds per inch width of tread; for top course, minimum weight shall be 285 pounds per inch width of tread.
3. Pneumatic-tired rollers, when conditions warrant, shall be provided with devices capable of varying tire pressures. When the mixture being spread by each paver requires more than the minimum number of steel wheel rollers, at least one of the additional rollers for each paver shall be a pneumatic-tired roller, except where the use of a vibratory roller is permitted. When using a pneumatic-tired roller, care shall be taken that initial rolling by the steel wheel roller be restricted to one pass where upon the pneumatic-tired roller shall immediately follow the initial steel wheel rolling.
4. Vibratory steel drum rollers shall not be used on top course mix or structures. The machine shall have a device registering the number of vibrations per minute and a tachometer shall be provided to Engineer in order to check the operation of the roller.
5. The V.P.M. on base and binder course material shall be a minimum of 1400 V.P.M. and a maximum of 1500 V.P.M., or in accordance with the recommendations of the manufacturer, when approved by Engineer.

6. The vibratory roller shall be operated with the vibrating drum in the direction of the paver and the vibrating action of the roller shall be completely shut off during change of direction and care exercised to start this action only when the roller is in motion. In order to prevent creeping and aggregate crushing during rolling of layered pavement, care shall be taken not to exceed one pass in the direction of the paver with vibrator in action and one return in a static condition and for deep lift pavements these passes shall not exceed two operations in each direction, except that the number of vibratory passes in either direction may be varied in order to obtain the required density.
7. A smoothing roller of either the pneumatic-tired or steel wheeled type shall be used immediately behind the last pass of the vibrating roller. The use of a vibratory roller may be suspended by Engineer if, in his opinion, unsatisfactory results are being obtained and no further mix shall be spread until a sufficient number of approved rollers are on the project to satisfy the compaction requirements.
8. A plate shall be attached to each roller which shall show the ballasted and unballasted weight per inch width of tread.
9. The number of rollers and passes required shall be governed by the compaction results; however, at least one steel roller shall be provided for each paver employed on the paving operation. This is independent of the requirements of the pneumatic-tired roller.

B. Compaction Procedures

1. Roll the mixture longitudinally, diagonally, and transversely as may be necessary to produce the required contour for surface. Start longitudinal rolling at the side and proceed toward the center of the pavement, except on superelevated curves start at the low side and progress to the high side, overlapping on successive trips by at least 12 inches.
2. Continue the rolling so that all roller marks, ridges, porous spots, and impressions are eliminated, and the surface has the required contour and grade. Maintain the motion of the rollers at all times slow enough to avoid any displacement of the hot mixture. Correct any displacement or marring of the surface resulting from reversing the direction of the roller or from any other cause.
3. To prevent adhesion with the mixture, keep the wheels of steel rollers lightly moistened with water. Excess water or oil for this purpose will not be permitted.
4. To prevent "roll-off" of the pavement edges and longitudinal joints on deep lift paving, leave the outer eight inches of the deep lift mixture unrolled until the temperature of the mix ranges between 150°F and 180°F., whereupon compact it with a steel roller.
5. Along curbs, structures, and all places not accessible with a roller, compact the surface thoroughly with mechanical tamping devices, smooth and true to established line, grade, and contour.
6. Density of completed pavement shall not be less than 95 percent of the density obtained from laboratory compaction of a mixture composed of the same materials in like proportions.

JOINTS

- A. Place mixture as nearly continuously as possible. Pass the roller over the unprotected end of newly placed mixture only when the placing of the course is to be discontinued for such length of time as will permit the mixture to attain initial stability. In all such cases, including the formation of joints as herein specified, provide for proper bond with the new surface for the full specified depths of the courses.
- B. Maximum length of longitudinal joint shall be such that the temperature of the mixture at the joint shall not be less than 150°F when the abutting mixture is placed.
- C. Make longitudinal and transverse joints in a careful manner, well bonded and sealed, true to line and grade. Where directed, cut back longitudinal and transverse joints to expose the full depth of the course and, when laying of the course is resumed, paint the exposed edge of the joint with a thin coat of bitumen. Carefully rake the new mixture against the joint, then thoroughly tamp and roll.
- D. In making joints along any adjoining edge such as curb, gutter, or an adjoining pavement, and after the mixture is spread by the paver, place by hand just enough of the hot material to fill any space left open. Set up these joints with the back of a rake at the proper height and level to receive the proper compaction.
- E. Stagger longitudinal joints in successive courses so that there is a minimum of one foot overlap between longitudinal joints in adjacent courses.
- F. Overlap the rolling of successive widths of courses as to leave smooth, uniform joints and cross sections.

JOINT AND CRACK SEALANTS

- A. Inspect existing pavement for conditions and defects that will adversely affect quality of work and which cannot be put into acceptable condition through normal preparatory work as specified. Starting installation constitutes Contractors acceptance of surface as suitable for installation.
- B. Remove vegetation and all incompressible materials from cracks and joints by means of hot compressed air lance. (Other methods such as routing w/compressed air cleaning may be substituted at Engineer's specification. Under ANY circumstances compressed air used for cleaning MUST be oil free.
- C. Prepare sealant in specified equipment. Heat sealant according to manufacturer's Product Data Sheet.
- D. Install heated sealant directly into cracks and joints not to exceed a one (1) inch wide band. Control thickness to one-eighth (1/8) inch above pavement surface. Finished sealed cracks and joints will be uniformly level and all "sinkers" will be refilled to achieve flush to one eighth (1/8) inch concave surface appearance.
- E. Care must be taken to keep the public from work area while sealant is being installed and traffic should not be allowed to cross sealant filled cracks and joints for a period of ten (10) minutes or until sealant has cooled sufficiently to prevent tracking. Failure to follow manufacturer's printed recommendations could result in a severe burn hazard.

FIELD QUALITY CONTROL

- A.** Test the plane of the finished surfaces of base, binder, and surface courses with a 16-foot straightedge, except use a 10-foot straightedge on vertical courses and on the top course of resurfaced streets which contain manhole covers, valve boxes, and the like.
- B.** Carefully apply the straightedge immediately after the first compaction by rolling, and from then on as may be necessary until and after the final compaction of the material in place. Hold the straightedge in successive positions parallel to the road centerline and in contact with the road surface; check the entire area from one side of the pavement to the other.
- C.** Correct irregularities which vary $\frac{3}{8}$ inch from a true finished surface in base and binder courses, and $\frac{1}{4}$ inch in top courses.
- D.** Irregularities which may develop before the completion of rolling and while the material is still workable, may be remedied by loosening the surface mixture and removing or adding material as necessary. Should any unsatisfactory irregularities or defects remain after final compaction, correct the defective work by removing and replacing with new material to form a true and even surface.

OPENING TO TRAFFIC

- A.** No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate stability has been attained, and the material has cooled sufficiently to prevent distortion or loss of fines, and the pavement has achieved a maximum temperature of 140°F.
- B.** If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of Engineer.

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TABLE 02513 – A
SPECIFICATION REQUIREMENTS FOR PERFORMANCE GRADED ASPHALT BINDERS

TESTS AT PG TEMPERATURE deg. C.	PG 64-22	PG 64-28	PG 52-34
Viscosity, Brookfield 135 degrees C Pa-sec.	3 Max.	3 Max	3 Max
Dynamic Shear, 10 Rad./sec. Kpa	1.00 Min.	1.00 Min.	1.00 Min.
RTFO, % Change	1.0 Max.	1.0 Max.	1.0 Max.
RTFO, Residue Dynamic Shear, KPa	2.20 Min.	2.20 Min.	2.20 Min.
PAV Residue Dynamic Shear, KPa	5,000 Max.	5,000 Max.	5,000 Max.
Creep Stiffness (s), MPa	300 Max.	300 Max.	300 Max.

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TABLE 02513-B**GRADATION REQUIREMENTS FOR COARSE AGGREGATE (PERCENT BY WEIGHT)**

Nominal Size of Stone Sieve Size						
2 in.						
		1-1 /2 in.	1-1 /4 in.	3 /4 in.	1 /2 in.	3 /8 in.
2-1/2"	90-100	100				
2"		100				
1-1/2"		95-100	100			
1-1/4"		25-50	85-100			
1"		35-70		100		
3/4"	0-15	0-25	10-40	90-100		
5/8"					100	
1/2"	0-5		0-8	10-50	85-100	100
3/8"				0-20	15-45	85-100
No. 4				0-5	0-15	20-50
No. 8					0-5	0-15
No.16						0-5

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TABLE 02513-C**MASTER RANGES FOR JOB MIX FORMULAE (PERCENT BY WEIGHT)**

Standard Sieves	Base Course	Binder Course	Intermediate Course	Top Course	Dense Mix	Surface Treatment	Patching Mix
2" 1-1/2"	100 90-100						
1" 3/4"	65-90 55-80	100 80-100	100 76-98				
1/2" 3/8"	40-65	55-80	66-86 57-77	100 80-100	100 80-100	100	100 90-100
No. 4 No. 8	20-45 15-33	28-50 20-38	40-60 26-46	50-76 37-54	55-80 48-63	80-100 64-85	50-65 24-36
No. 16 No. 30	8-17	8-22	17-37 11-27	26-40 17-31	36-49 24-38	46-68 26-50	14-28 8-25
No. 50 No. 100	4-12	5-15	7-19 6-16	10-23 5-16	14-27 6-18	13-31 7-17	5-21 3-15
No. 200 Bitumen	0-4 4-5	0-5 4.5-5.5	3-6 4.5-6.0	2-7 5.5-7.0	4-8 7-8	3-8 7-8	2-8 4-6

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TABLE 02513-D**ACTION LIMITS FOR AGGREGATE GRADATIONS AND BINDER CONTENT**

SIEVE DESIGNATION/BINDER CONTENT	ACTION LIMIT
Passing No.4 Sieve and Larger Sieve Sizes	JMF Target +/- 6%
Passing No. 8 Sieves	JMF Target +/- 5%
Passing No. 16 to No. 50 Sieves (Inclusive)	JMF Target +/- 3%
Passing No. 100 Sieve	JMF Target +_/- 2%
Passing No. 200 Sieve	JMF Target +/- 1%
Binder	JMF Target +/-0.3%

Deviations from the final approved mix design for bitumen content and gradation of aggregates shall be within the action limits for individual measurements as specified in Table 02513-D. The limits still will apply if they fall outside the master grading band in Table 02513-C.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

EXISTING SITE UTILITIES

DESCRIPTION OF WORK

- A. Work Included: This Section specifies the maintenance, support, protection, relocation, reconstruction and adjustment-to-grade, restoration, and abandonment of existing utilities affected by the construction work.
- B. For the purpose of this Section, utility means any public or private service, such as electric light and power systems; gas distribution systems; telephone, telegraph, cable television and other communication services; water distribution; storm drain and sanitary sewer services; police and fire communication systems; street lighting and traffic signs and signals; parking meters; and steam distribution systems.
- C. Coordination and work between utility companies and Contractor will be required.

GENERAL

- A. The location of existing underground pipes, cables, conduits, and structures as shown on the Plans have been collected from the best available sources and Pan Am Southern, LLC (Railroad) and MassDOT (Owner) together with its agents does not imply or guarantee the data and information in connection with the underground pipes, cables, conduits, structures and other parts as to their completeness nor their locations indicated. Contractor shall contact utility owners and request marking location of all their lines in the work areas. Contractor shall assume there are existing water, gas, electric and other utility connections to every building and structure, whether they appear on the Drawings or not. Any expense and/or damage to these shall be the responsibility of Contractor.
- B. Foundations and lines for services, police and fire alarm boxes, street and pedestrian lights, and traffic signals may not be shown on the Drawings. The appropriate utility companies and/or agencies shall be contacted and consulted for locations of the above.
- C. All utility companies, public and private, shall be notified, including those in control of utilities not shown on the Drawings (see Chapter 370, Acts of 1963, Massachusetts) prior to designing, excavating, blasting, installing, backfilling, grading, or restoring pavement. Contractor shall premark the area of excavation or work and notify the Dig Safe Center (1-888-DIG-SAFE) at least three business days prior to any excavation or work. In addition, notification shall be given to all affected private and/or public utilities to permit street marking of their lines.
- D. Some unknown utilities may exist in the areas to be excavated. Contractor shall take the necessary precautions when excavated in areas of potential utility conflict. Precautions may include, but are not limited to soil vacuum excavation, hand digging, or other non-destructive means. Contractor shall further be prepared to pre-excavate or pre-trench to locate potential utility conflicts prior to performing such activities as, but not limited to jacking, tunneling, installing temporary excavation support, etc.
- E. Interruptions of utilities shall not be permitted without written consent of the utility owner. Contractor shall coordinate with all utilities and provide all temporary utilities and connections to avoid interruptions.

SUBMITTALS

- A.** Submit working drawings and, if applicable, shop drawings showing the details, procedures, and scheduling for performance of the existing utility work. Show actual location of existing utility facilities; interferences which these facilities present to the new work; location of settlement markers; method proposed to proceed with the construction; details of proposed support systems; and, if applicable, method of testing and procedure for restoration.
- B.** Submit written evidence of affected utility owners' approval of the details, procedure, and scheduling.
- C.** Provide written notice two weeks in advance of the intended date to commence operations, to affected utility owners and parties having surface, subsurface or overhead structures in the construction area. Furnish Engineer copies of all notices.
- D.** If a settlement or movement monitoring system is required, submit copies of readings to Engineer and affected utility owner within 24 hours of the reading.
- E.** Submit to Engineer, certifications from the respective suppliers that the products to be incorporated in the work are in conformance with applicable requirements.

NOTIFICATION

- A.** Notify the appropriate utility agencies and Engineer at least 48 hours prior to starting any work involving or adjacent to utility service facilities.
- B.** Where an existing utility facility is encountered that is not indicated or that is determined to be a different utility facility than that indicated, promptly notify the Authority. Contractor is responsible for determining the owner of the facility and the disposition of the facility.

PRODUCTS

- A.** Products and materials shall be as specified in the Construction Specifications or by the utility company.

SALVAGE MATERIAL

- A.** Reuse materials designated to be salvaged, provided they are inspected and approved by the respective utility owner and Engineer. Salvaged material not designated for reuse or returned to utility owner shall become the property of Contractor.
- B.** Maintain and have available for inspection by Engineer a detailed record, including signed vouchers and receipts, of new and salvaged materials received from, used, or returned to the various utility owners.

EXECUTION

- A.** Conform to the specifications and standard practices of the affected utility owners. Coordinate with utility owners, which work shall be done by Contractor and which work shall be done by utility owner at Contractor's expense. Ensure continuity of all existing utility services to all users except when the

utility owner determines that temporary interruption is required.

- B.** Unless otherwise indicated or authorized in writing by Engineer, maintain all utility facilities complete in place.
- C.** Abandoned Facilities
 - 1. Demolish and remove abandoned utility facilities in conflict with work.
 - 2. Do not undertake demolition or removal of the service until written approval for such work has been obtained from the utility owner.
 - 3. When abandoned facilities are indicated to be left in place, plug, or cap or bulkhead the ends of conduits and pipes, as indicated. Pipe or conduit greater than 15-in in diameter shall be completely filled with Controlled Density Fill. Remove abandoned utility manholes, junction boxes, and similar structures to a minimum depth of two feet below finish grade and fill the remaining void with sand or select fill, as specified in Section EARTHWORK, after the plugging, or capping, or bulkheading of conduits and pipes has been completed. Puncture or break the bottom slabs of manholes and similar structures to provide drainage. Backfill and compact excavations resulting from removal of utility facilities, as required.
 - 4. Bulkheads for pipes greater than 15-in in diameter shall be constructed of solid concrete masonry bricks or solid concrete masonry blocks with full mortar joints. The bulkhead shall be watertight. Recess the bulkhead 1/2-in and seal with non-shrink grout.
- D.** Provide, install, and maintain all temporary facilities required to provide interim utility service when a utility facility is to be relocated and when a utility facility to be replaced is abandoned prior to replacement.
- E.** Where an existing utility facility is encountered which is not indicated, or which is determined to be a different utility service than that indicated, promptly notify Engineer who will assist in determining the owner of the facility and the disposition of the facility.
- F.** If, upon exposure, the condition or location of a facility to be supported complete-in-place is found by Engineer to be unsafe for support or for maintenance of service, replace or reconstruct the facility as required, with prior approval of Engineer and the utility owner.

SETTLEMENT OR MOVEMENT

- A.** Provide suitable settlement or movement monitoring systems where indicated or required by the affected utility owner.
- B.** In case of settlement or other movement which might cause damage, take immediate remedial measures to correct the conditions and damages caused by the settlement.

RECONSTRUCTION AND ADJUSTMENT-TO-GRADE

- A.** Relay, reset, or otherwise reconstruct miscellaneous structures and facilities as indicated.
- B.** Adjust-to-grade manholes and inlets as indicated, by raising or lowering the upper portion thereof.

- C. Backfill under utilities supported or exposed using controlled density fill to allow for the proper support and compaction under the utility. Contractor shall coordinate with the utility owner to determine the acceptability of the use of controlled density fill and shall work with the owner to develop alternate means to ensure the proper backfill and compaction under the utility.

AS-BUILT UTILITY LOCATION AND CONDITION SURVEY

- A. For each new or relocated utility installed, including those installed or relocated by others in the Project Area, perform an as-built location survey by coordinates prior to backfilling the excavation.
- B. The survey data shall be obtained by Global Positioning Survey (GPS) and certified by a Professional Land Surveyor registered in Massachusetts.
- C. A complete digital base plan shall be provided in AutoCAD DWG format Release 2000i or later on a Compact Disk (CD), properly referenced to the coordinate system established in the contract. The following standards shall be applicable:
 - 1. Text: Text shall be drawn using a STYLE of "L100-XX" (where XX refers to the plotted scale) and a font file of "SIMPLEX" as defined in the AutoCAD survey template provided by Engineer. The style shall be defined as a "fixed height" style, and have a height of 0.10 times the drawing plotted scale. (i.e. 4.0 for 40 scale plan, 2.0 for 20 scale etc.).
 - 2. Precision and Accuracy:
 - a. Horizontal Survey:
 - 1) Precision: Horizontal control and surveyed points shall maintain a minimum precision of 1:10,000.
 - 2) Accuracy: No more than 10% of the survey points shall be in error by more than 1/100 inch or 0.25 mm when viewed at the requested scale.
 - b. Vertical Survey:
 - 1) Precision: Vertical Control shall have a maximum error of closure no greater than .075 feet or .02 meters.
 - 2) Accuracy: No more than 10% of elevations when interpolated from a Surface shall be in error of more than 1/2 a contour interval.
 - 3. Surface Data: The data format shall conform to Autodesk Land Development Desktop Project files. If Contractor uses a different software product to create a surface, then the surface must be represented as a TIN (Triangulated Irregular Network) of 3D lines on a separate, distinct layer within the AutoCAD drawing file. 3D faces or 2 dimensional lines are NOT acceptable.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

GENERAL TRACK CONSTRUCTION

GENERAL

- A.** This Section specifies general information and requirements concerning track construction on Pan Am Southern, LLC (Railroad) and MassDOT (Owner) railroad property. For this project, track construction includes the following:
1. Construction of new Ballasted Track
 2. Installation of timber crossties
 3. Re-alignment, surfacing and tamping of existing tracks
- B.** The approximate limits of the above types of track construction are defined on the Contract Drawings and described in the Special Provisions.

APPLICABLE STANDARDS

- A.** Pertinent provisions of the following listed standards and publications shall apply to the Contract, except as they may be modified herein, and are hereby made part of these Specifications to the extent required.
1. American Railway Engineering and Maintenance Association, Manual for Railway Engineering, latest edition, herein referred to as the AREMA Manual.
 2. American Railway Engineering and Maintenance Association, Portfolio of Trackwork Plans, latest edition, herein referred to as the AREMA Portfolio.
 3. MBTA Railroad Operations Book of Standard Plans.
 4. MassDOT MW-1 Specification for Construction and Maintenance of Track.

QUALITY ASSURANCE

- A.** Contractor shall perform all measures necessary to assure quality of the Work. This shall include source quality control and field quality control requirements.
- B.** Contractor shall be experienced in the construction of the various types of trackwork included in this Contract. Such experience shall have been gained on at least three previous contracts of similar volume of work with other North American transit properties or railroads.

BALLAST

- A.** Ballasted track and special trackwork therein shall be constructed using AREMA No. 4 ballast in accordance with the Special Provisions.
- B.** The ballast shall be constructed to the cross-sections indicated on the Contract Drawings and as described in the Special Provisions.

PLACEMENT OF BALLAST

- A. Compact the finished subgrade prior to installation of ballast. Distribute and compact a six inch (6") layer of bottom ballast uniformly over the finished subgrade prior to tie distribution. Distribute and compact bottom ballast in three inch lifts uniformly over the finished subgrade. Total bottom ballast shall not exceed six inches (6"). Each bottom ballast layer shall not exceed four inches compacted depth. The finished grade of the compacted bottom ballast shall be two inches (2") below bottom of tie final grade, plus or minus one inch (+/- 1").
- B. Thoroughly compact ballast until stones are firmly interlocked and surface is true and unyielding. Compact ballast using vibratory compactors of either the roller or pad type. Dynamic force for either type shall not be less than 20,000 pounds and the frequency range shall be 1100 to 1500 vpm. Use machines equipped with a governor which can be set and locked to control rate of impulse. Provide a tachometer or other suitable device for accurately checking the frequency of vibration during the compacting operation.
- C. Top surface of initial layers of ballast shall be smooth, flat and uniformly compacted prior to distributing ties.

DISTRIBUTION OF WOOD TIES

- A. Carefully distribute and properly space ties on initial layer of ballast. Space all cross ties at 22" on center, except space ties at 18" within grade crossings. Tie spacing at turnouts may be adjusted to preserve switch timber spacing, but in no case should the maximum spacing between ties exceed 24 inches. There should be at least 10 wood ties in every 20 feet of track.
- B. Place timber ties so that heartwood is down. Do not adze ties unless approved. Handle treated ties in a manner to avoid breaking and bruising. Do not throw ties from cars or trucks onto rails or rocks.
- C. Place ties normal to centerline of track unless shown otherwise on Contract Drawings or as directed by Railroad. Properly space and align ties prior to rail installation. In placing or spacing treated ties, handle only with tongs or suitable devices. Do not use chisels, forks, mauls, picks, punches, shovels, or sledges for moving ties or placing them in position beneath rails. Avoid unnecessary handling, redistribution, and reloading of ties. To extent practical, distribute ties in proper position for use without further handling.

TIE PLATES

- A. Timber crossties shall have tie plates installed under each rail. As an alternate to the process described below, Contractor may use pre-plated ties, as long as the final trackwork meets the requirements stated in the following sections.
- B. Prior to installation of tie plates, clean contact surfaces to allow proper bearing of tie plate on tie and rail on tie plate.
- C. Locate centerline of tie plates on 8 feet 6 inch ties so that the line side of the tie is properly located from outer edge of base of rail. Tie plate shall be centered on the crosstie under rail.

- D. Locate tie plates on longitudinal centerline of each tie and place square to centerline of rail so that outside shoulder of plate bears fully against rail base. Place plate with the downward cant toward center of track.
- E. Secure rail on line end of ties to tie, in proper relation to tie end, before securing opposite rail. Use line rail as reference in securing opposite rail to proper gauge.

TIE PLATE - RESILIENT FASTENER

- A. Timber crossties shall have tie plates installed under each rail.
- B. Prior to installation of tie plates Contractor shall:
 - 1. Install liquid tie plugging compound in holes where spikes have been pulled from timber ties.
 - 2. Install liquid tie plugging compound into tie per manufacturer recommendations, and to the approval of the Engineer before installing tie plates or installing new spikes or screw spikes.
 - 3. Clean contact surfaces to allow proper bearing of tie plate on tie and rail on tie plate.
- C. Install Resilient Tie Plates and new rail section:
 - 1. Identify the line rail and remove the rail, plates and OTM OPPOSITE the line rail designated for rail replacement for that section. Do not remove more rail and/or OTM than can be safely replaced prior to an end of shift return to service.
 - 2. Place new resilient plates on tie and seat new rail in new plates approximate final installation location.
 - 3. Accurately gage new rail and plate assembly from existing line rail at 56 ½”.
 - 4. Fasten new resilient plate using two plate holding cut spikes.
 - 5. Bore and install screw spikes as described below.
 - 6. Clip rail to newly installed plates as described below.
 - 7. Repeat procedure on line rail, accurately gaging from newly installed rail.
- D. Tie Boring
 - 1. Field bore crossties and switch timber before fastening tie plates
 - 2. Holes in crossties shall be 5/8 inch diameter and 6 inches deep for 15/16 inch screw spikes.
 - 3. Location and number of holes shall conform to location and number of screw spikes. Boring of holes in excess of numbers required will not be permitted.
 - 4. Do not bore holes entirely through tie.
 - 5. After drilling, brush drill chips from top surface of tie.

SCREW SPIKES

- A. Start and install screw spikes vertically and square with rail. Install spikes straight.
- B. Screw spikes shall be set and driven in accordance with manufacturer's recommendations and specifications.
- C. Straightening screw spikes will not be permitted.
- D. Number of screw spikes used per tie shall conform to Contract Drawings and Specifications.
- E. Avoid removal of screw spikes once driven. When necessary, pull spikes and plug hole using liquid tie plug.
- F. Under no circumstances shall gauge be adjusted by striking lags, spikes, or plate edge after it is fixed to tie.
- G. Seat rail properly between tie plate shoulders. With outside base of rail tight against outside plate shoulder.

RAIL CLIPPING

- A. Install clip as specified by manufacturer and as shown on Contract Drawings and Specifications.
- B. Install two clips per tie per rail.
- C. Clips shall not be overdriven.

TRACK SPIKES

- A. Cut spike shall be new 5/8" x 6" reinforced throat duck bill with 6" under the head and conform to MBTA Railroad Operations Book of Standard Plans, Drawing 1210, MBTA Commuter Rail Material Specification No. 9212 and AREMA Manual for Railway Engineering Chapter 5, Part 2.

BOLTED JOINTED RAIL

- A. Standard bolted joints shall be in accordance with the Contract Drawings and Special Provisions.
- B. Standard bolted joints on opposite rails shall be staggered a minimum of four ties.
- C. Compromise bolted rail joints shall be staggered a minimum of fifteen feet (15') when the height difference between the connecting rail sections is less than one-half inch (1/2'). When the height difference between the connecting rail sections exceeds one-half inch (1/2'), the opposite rail joints shall be within the same crosstie crib. Compromise bolted rail joints shall not be located on a crosstie or rail plate.
- D. All bolted rail joints shall have a gap between 1/8" and 3/16".

RAIL ANCHORS

- A.** Rail anchors shall be of the drive on type designed to properly fit and hold the designated rail section. Rail anchors shall conform to AREMA Manual for Railway Engineering, Chapter 5, Part 7 for functional design.
- B.** Rails shall be anchored in accordance with MassDOT MW-1, Section 125. Rail anchors shall not be installed in grade crossings within the limits of rail seal or manufactured crossing system unless specified by the manufacturer.
- C.** Rail anchors not required on ties with resilient rail fasteners.

ADJUSTMENT AND REPLACEMENT OF RAIL ANCHORS

- A.** Rail anchors not required on ties with resilient rail fasteners.
- B.** Rail anchors are to be re-installed on all new crossties and switch timbers when the crosstie or switch timber being replaced was anchored. Unusable or damaged anchors shall be replaced with new anchors designed for the rail section being anchored. Rail anchor installation shall be in accordance with current AREMA and MassDOT MW-1 Standards.
- C.** Crossties and switch timber shall be box anchored and anchors shall be fully engaged with the rail base with full bearing against both sides of the crosstie or switch timber. All requirements of these Special Provisions with respect to Track Gage, Material, Tie Installation and Finished Track Condition following tie installation shall apply to rail anchor installation. Rail anchor restoration/installation for all work in this contract shall be incidental to work of installation of crossties/switch timber.

SURVEYING REQUIREMENTS

- A.** Employ a qualified surveyor to perform the survey required within the project limits and assume full responsibility for all dimensions and elevations taken and the setting of lines and grades relating thereto.
- B.** Furnish and place markers for the control points and reference points of the track centerlines, as needed to build worked track to its designated alignment and surface. A minimum of six control points must be established for installation of the switches.
- C.** Maintain control points and reference points for the duration of the work.

HI-RAIL CONSTRUCTION EQUIPMENT

- A.** Contractor shall submit a list of hi-rail construction equipment to be used to perform trackwork including weights and dimensions. The equipment will not be permitted on MassDOT property until it has been approved.
- B.** Contractor shall verify that his track-mounted or hi-rail equipment complies with the standards set by the AAR Mechanical Division.
- C.** Operate only equipment in a good state of repair and with all safety appliances and protective devices

in place and functional.

- D. Rail wheels with flat spots of length exceeding 8 percent of the wheel diameter are prohibited. Any equipment with a wheel with a flat spot exceeding 5 percent of the wheel diameter is restricted to a maximum speed of 10mph on bridges.
- E. Contractor's equipment shall not exceed the design loads for any track or structure. Contractor shall verify that proposed equipment meets these requirements.
- F. Contractor's equipment shall physically clear all fixed obstructions within the limit of the project, including signal and power installations. Any damage caused by Contractor will be repaired or replaced as determined by the Railroad at no additional cost to Owner.

TRACK GAGE

- A. Track gage shall be $56\frac{1}{2}'' \pm 1/8''$ measured at a right angle to the rail from inside face to inside face of the rails between points $5/8$ -inch below the top of rail. If the track gage of adjacent, existing ties and switch timber vary outside the $56\text{--}3/8''$ to $56\text{--}5/8''$ range, then gage of adjacent, existing ties and switch timber must be adjusted to conform to the limits given above. Any gage transition into existing conditions must be approved by Pan Am Southern, LLC (Railroad) or MassDOT (Owner's) Authorized Representative. It is mandatory that Contractor run the spiker with the gage function on.

TRACK GEOMETRY

- A. Track shall be constructed in conformance with the Contract Drawings, AREMA Recommended Practices and the MassDOT MW-1.
- B. For tangent track the alignment is to be based on each centerline of track, equidistant between the gauge sides of the running rails.
- C. For curved track, the alignment is to be based on the centerline of track with the outside rail located 2 feet $4\text{--}1/4$ inches radial from the centerline measured in the plane of the rails.
- D. Track gauge shall be measured as specified for Gauge, Track under Definitions. Gauge shall be 4 feet $8\text{--}1/2$ inches.
- E. Rail Cant:
 - 1. Ballasted track shall be constructed with rail cant at 40 to 1 inward inclination of the rails.
 - 2. Rail in special trackwork shall be constructed with no cant.
- F. Superelevation:
 - 1. Primary track curves shall be superelevated as shown on the Contract Drawings.
 - 2. Elevation, or superelevation, is the vertical distance of the outer rail of a curve above the inner rail. It is provided to overcome or partially overcome the effects of curvature and speed. Superelevation shall be as shown on the plans. Tangent track shall not be superelevated, except as provided in the paragraph below.

3. Superelevation shall be attained gradually and uniformly over the length of the spiral or as indicated. Superelevation shall change no more than one inch (1") in 62 feet. Full elevation shall be achieved at the start of the body of the curve - if necessary up to one inch may be run off in tangent track. The outer rail shall be superelevated above the inner rail; the inner rail shall be at the required profile.
4. Spirals - The superelevation at the point of tangency shall be zero and shall increase uniformly through the length of the spiral to full elevation of the outer rail at the spiral-to- curve point. This spiral shall be provided at the ends of simple curves and segments of compound curves as measured in the field.
5. Turnouts and crossovers shall not be superelevated, unless specifically noted on the plans.
6. Prior to final surfacing, brass tags attached to the ties shall be used to mark the beginning and ending points of superelevation and shall be located at 1/4 inch increments between the beginning and ending points of the superelevation transition. Tags shall be placed to be read while facing along the track excepting the tag at full elevation which shall be placed to read facing the high rail, to plainly indicate the authorized full elevation. The amount of superelevation shall be as indicated on the plans.

G. Track Surface:

1. Track surface is the relationship of opposite rails to each other in profile and cross level. Track profile is the running surface along the top of the grade rail. Cross level is the difference in elevation of the tops of heads of opposite rails measured at right angles to the track alignment. The ideal surface is a uniform profile consisting of straight gradients connected by vertical curves, with zero cross level on tangents and predetermined cross level on curves.

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TRACK CONSTRUCTION TOLERANCES

- A. The track construction tolerances shall be as specified in Table I below.

TABLE I
TRACK CONSTRUCTION TOLERANCES

Gage Variation from requirements of section Track Gage Difference in 62'	$\pm 1/8$ -inch 1/8-inch
Cross Level: Variation from zero at any point in tangent track Variation from computed value in spirals and curves Rate of change of permissible variation from requirements of section Track Geometry shall not exceed	$\pm 1/8$ -inch $\pm 1/8$ -inch 3/16-inch in 62 feet
Horizontal Track Alignment: (1) (2) Maximum deviation from tangent or permissible variation from uniform curvature on curves shall not exceed Rate of change of permissible variation shall not exceed	$\pm 1/4$ -inch 3/16-inch middle ordinate to a 62-foot chord on curves, and 1/16-inch middle ordinate to a 62-foot chord on tangent
Vertical Track Profile: (1) Rate of change of permissible variation shall not exceed	1/8-inch middle ordinate of a 62-foot chord

NOTES:

- (1) Measured on the line rail. Use either rail as the line rail on tangent track, except that the same rail shall be used for the full length of the tangent. Use the outer rail as the line rail on curved track.
- (2) Total deviation in station areas to be $\pm 1/8$ inch vertical and $\pm 1/4$ inch horizontal to insure ADA/MAAB compliance.

SURFACING AND ALIGNING

- A. Contractor shall distribute sufficient top ballast to tamp and raise reconstructed siding and yard tracks to match the profile of the proposed finished top of rail grade. Top of rail shall be within $\frac{1}{2}$ " of proposed final top of rail grade for all tracks/rails with specified final grades on contract plans.

- B.** At the conclusion of the track construction, Contractor shall perform surface and alignment of all tracks within the project limits using approved on-track equipment.
- C.** Surface and Lining of all tracks must meet FRA Class 2 Geometry and all switch turnouts must meet FRA Class 5 Geometry. Surfacing and lining with a non-production machine is permissible provided that it is done under the direction of a surveyor and approval of Railroad.
- D.** Following this work, Contractor shall perform Quality Control (QC) work to correct track defects created by the surfacing and lining work. QC corrections will address defect both with existing and newly installed ties and include high spikes, tie plates not centered, plate shoulder or other object (stone, spike head, etc.) bearing under rail base, and down ties.
- E.** Both sides of all switches shall be surfaced, lined and tamped. Track surface shall be run out at least 100 feet beyond switches and the ends of the re-alignment areas or as directed by Railroad.
- F.** Following the completion of surfacing, lining and tamping, Contractor shall plow/sweep remaining ballast so that all track is completely swept, all cribs are filled to at least 1" below top of tie, no ballast remains on the top of ties, and all areas outside switches are smooth and level.

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

SPECIAL TRACKWORK

DESCRIPTION

- A. This Section includes specifications for the furnishing and installation of fully assembled, Wood Tie Construction, Turnout(s) per current AREMA Portfolio of Trackwork Plans and current AREMA Manual for railway Engineering, Volume 1, except as modified in MBTA Railroad Operations Book of Standard Plans and all other MBTA Railroad Operations Book of Standard Plans referenced. Turnout size, rail section, hand and other specific requirements as specified in the Contract Plans, Special Provisions and other Project documents.

SUBMITTALS

- A. Prior to manufacture of all turnout components, the Manufacturer shall submit a complete set of shop drawings, construction plans and method of assembly to Contractor, MassDOT (Owner's) Authorized Representative and Pan Am Southern, LLC (Railroad) for approval.
- B. Manufacturer shall be responsible for all tests and inspections necessary to ensure that the new Turnout(s) meet(s) the requirements of this specification and conforms to the MBTA Material Specifications and Standard Plans cited.
- C. Manufacturer shall submit results of all tests, measurements, calculations, catalog cuts and any other pertinent data necessary to ensure turnout is in compliance with these specifications to Contractor, Owner's Authorized Representative and Railroad.
- D. Manufacturer shall submit date when fully assembled turnout will be available for inspection by Contractor, Owner's Authorized Representative and Railroad at the manufacturer's facility.
- E. All calculations and other required data to be furnished on standard 8-1/2" x 11" sheets, printed on one side only. Furnish all drawings on sheets measuring 22" x 34". The shop drawing title block and data sheets shall display the following:
1. Contract Number and Name
 2. Number and Title of the Drawing
 3. Date of Drawing or Revision Date and Number
 4. Name of Contractor Submitting Drawing

QUALITY CONTROL

- A. The Contractor shall ensure that the Manufacturer develop and maintain a quality control program, regulating methods, procedures, and processes to ensure compliance with standards of quality required by the Contract Documents, including inspection and testing, samples and use of certificates of compliance.

INSPECTION

- A. Contractor, Owner's Authorized Representative and Railroad will be allowed to inspect the fully assembled turnout at the Manufacturers facility prior to shipment.

PRODUCT

- A. Fabricate all special trackwork components as shown on conformed Shop Drawings, and in accordance with the following requirements.
- B. Special trackwork shall be of wood tie and ballast construction.
- C. Special trackwork shall be constructed with zero cant throughout the installation.
- D. Special trackwork rails shall be head-hardened.
- E. Special trackwork shall be jointed track installation.
- F. All special trackwork components shall be new, unless otherwise specified herein and shall conform to the AREMA Portfolio of Trackwork Plans, Specifications for Special Trackwork, Plan 100-92, Pages 1 to 11 inclusive.
- G. All rail braces shall be machined for switch heaters per MBTA Standard Plan 3040.
- H. The designated rail section of the turnout shall be head-hardened and conform to MBTA Commuter Rail Material Specifications.
- I. Turnout shall be jointed construction. Manufacturer shall provide all necessary, 6-hole joint bars, complete with 4 track bolt, nut and washer assemblies for each joint.
- J. Turnout shall be fully assembled and checked for specified tolerances prior to shipment. Turnout shall be match marked with permanent metal marker, disassembled, and packed for delivery by the manufacturer.

MATERIAL

- A. Turnout Rail – All rail shown on plan of the MBTA Railroad Operations Book of Standard Plans shall be included as part of the turnout assembly. All rails shown on plan shall be high strength, head-hardened rail in accordance with AREMA Manual for Railway Engineering, Chapter 4, including Supplemental Requirements, with a Brinell hardness range of 341 to 388. Submit all rail inspection results required according to previous AREMA Forms 401A through 401C as shown in Appendix B.
- B. Rails ends shall be drilled per plan No. 1300 of the MBTA Railroad Operations Book of Standard Plans, except that the first hole nearest the rail end shall be omitted. Drill two holes only for each rail end.
- C. Switch Points – Turnout switch points shall conform to the dimensions shown on plan of the MBTA Railroad Operations Book of Standard Plans and to the AREMA Portfolio of Trackwork Plans, plan No. 221, Detail No. 5100.

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- D. Stock Rails** – Stock rails shall be undercut in accordance with AREMA Portfolio of Trackwork Plans, plan No. 221, Detail 5100.
- E. RBM Frog** – Frog shall be Railbound Manganese Steel Frog in accordance with plan the MBTA Railroad Operations Book of Standard Plans for the frog size designated in the project documents and shall adhere to the following:
1. Manganese insert shall be 3 shot explosive hardened. Casting shall be radiographically tested for internal soundness by the manufacturer. Internal soundness of casting shall comply with radiographic testing quality standard levels, as shown on Plan No. 1012 in the AREMA Portfolio of Trackwork Plans.
 2. Radiographic testing shall be done in conformance with the current version of the following ASTM Specifications:
 - a. E-94 – Recommended Practice for Radiographic Testing
 - b. E-142 – Controlling Quality for Radiographic Testing
 - c. E-446 – Reference Radiographs up to 2” thickness, (0’ to 2”)
 - d. E-186 – Reference Radiographs for Heavy Wall Steel Casting, (2” to 4 ½”)
 - e. E-280 - Reference Radiographs for Heavy Wall Steel Casting, (4 ½” to 12”)
 3. Wing and heel rails shall be fabricated from fully heat-treated 136 RE rail in conformance with AREMA Manual for Railway Engineering, Chapter 4, including Supplemental Requirements, with a Brinell hardness range of 341 to 388.
 4. Rails ends shall be drilled per plan No. 300 of the MBTA Railroad Operations Book of Standard Plans, except that the first hole nearest the rail end shall be omitted. Drill two holes only for each rail end.
- F. Frog Plates** – Frog Plates shall be the type for use with resilient rail fasteners and otherwise in conformance with the MBTA Railroad Operations Book of Standard Plans.
- G. Frog Guard Rail** – Turnout guard rails shall be one piece, solid manganese, and conform to plan No. 2302 of the MBTA Railroad Operations Book of Standard Plans.
- H. Insulated Joint Plug Rails** – Insulated joint plug rails shall be to the lengths indicated on the MBTA Railroad Operations Book of Standard Plans, and shall conform to MBTA Material Specification No. 9221 titled “Insulated Bonded Joint Plug Rail” and plan No. 1340 of the MBTA Railroad Operations Book of Standard Plans. Rail ends shall be drilled per plan No. 1300 of the MBTA Railroad Operations Book of Standard Plans, except that the first hole nearest the rail end shall be omitted. Drill two holes only for each rail end.
- I. Tie Plates** – Tie Plates shall be resilient fastener type in conformance with MBTA Material Specification No. 9269 titled “Tie Plate – Resilient Fastener” and with plan No. 1255 of the MBTA Railroad Operations Book of Standard Plans.
- J. Rail Fasteners** – Rail clips shall be resilient fastener type and shall permit removal of the rail, switch or frog without the removal of the plate or lag screws. Resilient fasteners shall be in conformance with MBTA Material Specification No. 9245 titled “Resilient Fastener”.
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- K. Rail Joints** – Rail joint bar sets shall be 2- 36 inch, 6 hole, short toe, head free design in accordance with plan No. 1322 of the MBTA Railroad Operations Book of Standard Plans and shall be complete with four (4) bolt, nut and washer assemblies per MBTA Material Specification No. 9227 titled “Joint Bars and Fastenings”.
- L. Screw Spikes** – Screw spikes shall be in accordance with MBTA Material Specification No. 9246 titled “Screw Spikes”.
- M. Switch Timber** – Switch Timbers for turnout shall be provided in accordance with the tie layout shown in the MBTA Railroad Operations Book of Standard Plans for the turnout size indicated in the Project documents.
- N. Switch Stand** – Turnout shall be supplied complete with all necessary components for hand throw switching. Components to be supplied include, but are not limited to:
 - 1. Racor 36-EH, or approved equal heavy duty non-trailable switchstand
 - 2. High mast and target
 - 3. Ergonomic handle
 - 4. Connecting rod with all necessary connection components
 - 5. Switch rods and switch rod components
 - 6. All incidental switching components necessary
- O. Compromise Joints** – Compromise joint bar shall be provided as necessary for the installation of a crossover with rail section differing from the adjoining track section(s). The compromise bars shall be 36 inch, 6 hole, short toe, head free design and shall be complete with four (4) bolt, nut and washer assemblies per Project documents.
- P. Transition Rails** – Transition rails shall be provided as necessary for the installation of a crossover with rail section differing from the adjoining track section(s) per project documents.

HANDLING, SHIPPING AND UNLOADING

- A.** Carefully handle all rail and special trackwork components to minimize the chance of damage. Rails shall not be dropped or struck sharply. Handle and ship all rail and special trackwork in accordance with AREMA Specifications, Chapter 4.
- B.** All components shall be pre-assembled for inspection prior to shipment and shall be shipped in complete partial subassemblies. Small loose parts shall be shipped in secure shipping boxes and/or kegs. Cardboard boxes are not acceptable. Pallets not fully banded are not acceptable. Loose items for shipping are not acceptable.
- C.** Switch plates and braces shall be palletized and banded or crated for shipment.
- D.** Switch rods shall be banded together.
- E.** Switch points and stock rails shall be banded together and properly blocked to prevent damage. All turnout rails shall be loaded heads up on blocking.
- F.** Joint bars shall be wired into pairs, palletized and strapped for shipment. Bolts, nuts and washers shall be packed into kegs for shipment.

- G. All assembled parts, pallets, bundles, boxes and kegs shall be clearly marked or tagged in the with the following: identification of items contained, Contractor's name, shipping date, number of pieces, destination, gross weight, turnout letter designation, and special trackwork unit for which parts are intended.

INSTALLATION OF TURNOUT(S)

- A. Contractor shall install the Turnout(s) and connect to the existing tracks utilizing the transition rails and compromise joints as necessary.
- B. Following the installation of the turnout, unload ballast in tie cribs and shoulders of track structure. Unload ballast in quantities which will fill tie cribs and provide an adequate amount of ballast for the initial track raise with sufficient surplus to continue to hold track after initial raise. Contractor shall distribute the stone ballast in sufficient quantity for tamping the track and for restoring the ballast section.
- C. At the conclusion of the turnout installation, Contractor shall perform final surface and alignment of the turnout and adjacent tracks within the project limits using approved on-track equipment. Surface and Lining of all switches and tracks must meet as stated in the geometry table. Surfacing and Lining with a Mark IV production tamper or equivalent may be required per Project documents. Both sides of the turnout shall be surfaced, lined and tamped. Track surface shall be run out at least 100 feet beyond the ends of the re-alignment areas or as directed by Owner's Authorized Representative or Railroad.
- D. Following the completion of surfacing, lining and tamping, Contractor shall plow/sweep remaining ballast so that all track is completely swept; no ballast remains on top of ties, tie plates or base of rail; all cribs are filled to no higher than top of tie/timber and no lower than 1" below top of tie/timber, except where necessary to allow unobstructed movement of the switch rods. All areas outside switches are smooth and level.
- E. Cribs containing switch rods shall be properly cleaned out so that ballast will not interfere with the throw of the switch. Areas between switch points and stock rails shall also be cleared of ballast to the tops of the timbers so as not to interfere with switch operations.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

FURNISH AND INSTALL BALLAST

GENERAL

- A.** This Section specifies the testing and furnishing of Track Ballast.
- B.** Related work includes Section Final Surface and Align Track of these Special Provisions.
- C.** Contractor shall employ an independent, certified laboratory, acceptable to MassDOT (Owner) and Pan Am Southern, LLC (Railroad), to perform the specified testing of the ballast stone.

QUALITY ASSURANCE

- A.** Submittals will be reviewed for general conformance with the intent of the Contract Documents. This review will not relieve Contractor of final responsibility for the means, methods, procedures, and sequences to be utilized.
- B.** Submit name and location of proposed ballast supplier.
- C.** Submit name and qualifications of testing laboratory.

HANDLING

- A.** Load ballast only into rail cars or trucks, which are in good order, tight enough to prevent leakage and waste of material, and clean and free from rubbish or any substance that would foul ballast.
- B.** Handle prepared ballast at production plant, during shipment and at work site so that it is kept clean and free from segregation. Do not make repeated passes of equipment over same level in stock pile area.

QUALITY CONTROL

A. Ballast Production Site Testing

1. Notify Engineer of proposed source and location of crushed stone ballast no less than 5 days prior to shipment of any ballast to the work site. Engineer shall observe the taking of samples of proposed material and the testing of them for conformance to classification, quality, and grading requirements. Samples of ballast for testing shall be taken from each 500 tons of prepared ballast. Sample shall be representative and shall weigh not less than 150 pounds.
2. Contractor will notify Engineer of test results. Failure of ballast to meet the requirements of this Specification shall mean rejection of ballast quarry.
3. Ballast material shall be approved in writing by Engineer prior to commencing work site delivery.
4. If, during ballast installation, the source of ballast changes, Contractor shall immediately notify the Engineer and perform tests of new production site in accordance with these Specifications. Ballast shall have the same or higher classification, quality, and grading as former ballast used. Work site delivery shall not commence until the Engineer has approved, in writing, the new ballast source.

B. Ballast Job-Site Testing

1. Periodically during progress of trackwork, Railroad or Owner will test samples of ballast obtained from in-place locations designated by the Engineer to ensure a uniform quality of ballast.
2. If ballast in-place does not conform to requirements of these Specifications Engineer will notify Contractor to stop further loading of ballast until fault has been corrected and to dispose of defective material without cost to Railroad or Owner.
3. Engineer reserves the right to reject any load of ballast arriving at work site for unloading that does not conform to this specification. The load shall be disposed of without cost to Railroad or Owner.

MATERIALS TO BE FURNISHED BY CONTRACTOR (PER SPECIAL PROVISIONS)

- A. Ballast shall conform to AREMA Size No. 4 per AREMA Chapter 1, Part 2, Table No. 1-2-2 as modified by these specifications.
- B. Ballast shall be crushed, quarried, washed stone conforming to the current AREMA Specification Chapter 1, Section 2 and as modified in this section.

C. Ballast Quality Requirements:

1. Deleterious Substances. The amount of deleterious substances present in prepared ballast shall not exceed the following limits, when using test methods specified herein.

	Percent By <u>Weight</u>	<u>Method of Test</u>
Soft and Friable Pieces	3.0	ASTM C142
Material Finer Than No. 200 Sieve	0.5	ASTM C117
Clay Lumps	0.5	ASTM C142

2. Flat or elongated particles having a length equal to or greater than five times the average thickness of the particle shall not exceed five percent by weight of the total when visually inspected.
3. Water absorption shall not exceed 0.4 pounds per cubic foot when tested in accordance with ASTM C127.
4. Percentage of wear, when tested in the Los Angeles abrasion machine in accordance with ASTM C535, grading No. 2, shall not exceed 18 percent.
5. Soundness of the prepared ballast shall be such that when tested in the sodium sulphate soundness test in accordance with ASTM C88, weighted average loss shall not exceed 1.5 percent after 10 cycles of test.

6. Cementing value of the ballast shall not exceed an average value of 320 pounds per square inch for five specimens when tested in accordance with the Logan Walter Page Method (U.S. Department of Agriculture, Bulletin No. 347, 1916, Pg. 15) except as modified as follows:
 - a. A sufficient amount of pea size pieces of the rock, amounting to about 500 grams (1.1 pounds) is revolved in Los Angeles Abrasion Cylinder with three cast iron balls 4.76 cm. (1.875 inch) diameter and weighing approximately 0.43 kilograms (0.95 pounds) at the rate of 30 and 33 revolutions per minute, and the stiff dough at room temperature resulting from about 500 grains (17.64 oz.) of dust screened through a 100 mesh sieve, mixed with sufficient water, thoroughly kneaded for five minutes, allowed to stand in an air tight container for two hours, is molded into cylindrical briquettes 2.54 cm. (1 inch) diameter by 2.54 cm. (1 inch) in height under a pressure of 132 Kgs. per sq. cm. (1877.5 pounds per square inch), after which they are dried for 20 hours in air at room temperature, 4 hours in a hot air bath at a temperature of 100°C (212°F), then cooled for 20 minutes in a desiccator and immediately tested in a compression testing machine for static crushing strength, the bearing heads being suspended by pivots to secure uniform distribution of load, which is applied at 600 pounds per minute, approximately.
7. Determine ballast weight per cubic foot in accordance with ASTM C29.
8. Ballast samples shall be obtained in accordance with ASTM D75.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

CONSTRUCTION OF YARD TRACKS

GENERAL

- A. Clear, grade and remove existing ballast stone/excavation material to bottom of tie grade. Dispose of excess stone/excavated material onsite as directed. Thoroughly compact track bed with double-drum vibratory roller. Add new, #4 AREMA bottom ballast stone (as needed) to a grade of one inch (1") to a maximum two inches (2") below finished bottom of tie.
- B. Build track maintaining 1/2 rail joint stagger or as directed by the MassDOT (Owner's) Authorized Representative or Pan Am Southern, LLC (Railroad). Cut and drill rails to achieve stagger as necessary or directed. Track construction to be specified rail on 7"x9"x8'-6" ties spaced on 22" centers except space ties at 18" within grade crossings. Connect to existing rail at locations identified by Owner's Authorized Representative, cutting and drilling rail as necessary.
- C. Flood track with new, #4 AREMA ballast stone. Surface and align track to maintain continuous, consistent track geometry throughout, as directed. Thoroughly tamp track (minimum three (3) insertions). Clear ballast from ties within gage and to no higher than the top of tie in cribs. After completion of the track construction, build up the tread surface of any joint in the adjoining rail as required to match the tread surface of the adjoining rail. Tread build-up will be required for any construction related mismatch equal to or exceeding 1/16" as determined by Owner's Authorized Representative or Railroad.

PLACEMENT OF BOTTOM BALLAST

- A. Smooth and mechanically compact the finished subgrade to the appropriate cross slope to receive bottom ballast.
- B. Distribute and compact bottom ballast in three-inch lifts uniformly over the finished subgrade prior to tie distribution. Total bottom ballast shall not exceed six inches. Each bottom ballast layer shall not exceed four inches compacted depth.
- C. Thoroughly compact ballast until stones are firmly interlocked and surface is true and unyielding. Compact ballast using vibratory compactors of either the roller or pad type. Dynamic force for either type shall not be less than 20,000 pounds and the frequency range shall be 1100 to 1500 vpm. Use machines equipped with a governor which can be set and locked to control rate of impulse. Provide a tachometer or other suitable device for accurately checking the frequency of vibration during the compacting operation.
- D. Top surface of compacted bottom ballast shall be smooth, flat and uniformly compacted prior to distributing ties.

DISTRIBUTING AND SPACING WOOD CROSS TIES

- A. Carefully distribute and properly space ties on top of compacted bottom ballast. Space all cross ties at 22" on center except space ties at 18" within grade crossings. There should be at least 10 wood ties in every 20 feet of track.

- B.** Place timber ties so that heartwood is down. Do not adze ties unless approved. Handle treated ties in a manner to avoid breaking and bruising. Do not throw ties from cars or trucks onto rails or rocks.
- C.** Place ties normal to centerline of track unless shown otherwise on Contract Plans. Properly space and align ties prior to rail installation. In placing or spacing treated ties, handle only with tongs or suitable devices. Do not use chisels, forks, mauls, picks, punches, shovels, or sledges for moving ties or placing them in position beneath rails. Avoid unnecessary handling, redistribution, and reloading of ties. To extent practical, distribute ties in proper position for use without further handling.

TIE PLATES

- A.** Timber crossties shall have tie plates installed under each rail. As an alternate to the process described below, Contractor may pre-plate ties, as long as the final trackwork meets the requirements stated in the following sections.
- B.** Prior to installation of tie plates, clean contact surfaces and adz tie as necessary to allow proper bearing of tie plate on tie and rail on tie plate.
- C.** Locate tie plates on 8 feet 6 inch ties so that the line side of the tie is properly located from outer edge of base of the rail. Tie plate shall be centered on the crosstie under rail.
- D.** Locate tie plates on longitudinal centerline of each tie and place square to centerline of rail so that outside shoulder of plate bears fully against rail base. Place plate with the downward cant toward center of track.

RAIL INSTALLATION

- A.** Secure line rail and plates to tie, in proper relation to tie end, before securing opposite rail. Use line rail as reference in securing opposite rail to proper gage.

BOLTED JOINTED RAIL

- A.** Standard bolted joints shall be in accordance with the Contract Plans and Special Provisions.
- B.** Standard bolted joints on opposite rails shall be staggered a minimum of four ties.
- C.** All bolted rail joints shall have a minimum of 1/8" gap.
- D.** Stagger bolted compromise joints on opposite rails a minimum of four (4) ties, unless approved by the MassDOT Representative.

RAIL ANCHORS

- A.** Rail anchors not required for new ballasted track constructed with resilient rail fasteners.
- B.** Box anchor both rails on every other new tie within the limits of track construction unless they conflict with joint bars, turnout parts, etc. In turnouts and within 200' of at-grade crossing approaches, box anchor all rails on all ties except where prohibited by track related obstructions.

- C. Rail anchors shall fit tightly against the side of the tie to which it is anchoring.

TRACK GEOMETRY

- A. Track shall be constructed in conformance with the Contract Plans, Special Provisions, AREMA Recommended Practices and the MassDOT MW-1.
- B. Track gage shall be 4 feet 8-1/2 inches.
- C. Ballasted siding and yard track shall be constructed with rail cant at 40 to 1 inward inclination of the rails.
- D. M.O.W. ballasted siding and yard track shall not be superelevated.

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TRACK CONSTRUCTION TOLERANCES

- A. The track construction tolerances shall be as specified in Table I below.

TABLE I
TRACK CONSTRUCTION TOLERANCES

Gage	
Variation from requirements of section TRACK GAGE	$\pm 1/8$ -inch
Difference in 62'	1/8-inch
Cross Level:	
Variation from zero at any point (All siding and yard track shall be zero cross level, including turnouts, curves and tangents)	$\pm 1/2$ -inch
Rate of change of permissible variation from requirements of section Track Geometry shall not exceed	1/4-inch in 62 feet
Horizontal Track Alignment: (1)	
Maximum deviation from tangent or permissible variation from uniform curvature on curves shall not exceed	1/4-inch
Rate of change of permissible variation shall not exceed	3/16-inch middle ordinate to a 62-foot chord
Vertical Track Profile: (1)	
Rate of change of permissible variation shall not exceed	1/2-inch middle ordinate of a 62-foot chord

NOTES:

- (1) Measured on the line rail. Use either rail as the line rail on tangent track, except that the same rail shall be used for the full length of the tangent. Use the outer rail as the line rail on curved track.

FINAL SURFACING AND ALIGNING

- A. Contractor shall furnish and distribute sufficient top ballast to tamp and raise reconstructed siding and yard tracks to match the profile as shown on the Contract Plans.

- B.** At the conclusion of the track reconstruction, Contractor shall perform final surface and alignment of siding tracks within the project limits using approved on-track equipment.
- C.** Surface and Lining of all tracks must meet FRA Class 2 Geometry or as stated in the table above, whichever is more stringent. Surfacing and Lining with a Mark IV production tamper or equivalent is required.
- D.** Following the completion of surfacing, lining and tamping, Contractor shall plow/sweep remaining ballast so that all track is completely swept; no ballast remains on top of ties, tie plates or base of rail; all cribs are filled to no higher than top of tie/timber and no lower 1" below top of tie/timber.
- E.** Following this work, Contractor shall perform Quality Control (QC) work to correct track defects created by the surfacing and lining work. QC corrections will address defect both with existing and newly installed ties and include high spikes, tie plates not centered, plate shoulder or other object (stone, spike head, etc.) bearing under rail base, and down ties.

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

TIMBER CROSSTIE

GENERAL

- A. These Specifications describe requirements for the procurement of timber crossties to be used on the rail lines owned by the Massachusetts Department of Transportation (MassDOT or Owner). Crossties shall meet, in every respect, Specifications of the American Railway Engineering and Maintenance-of-Way Association (AREMA) contained in the Manual for Railway Engineering, Specifications for Timber Crossties, Chapter 30, Sections 3.1.1.4 and 3.7.5, and these specifications.
- B. Crossties sizes covered in this Specification include: seven inches deep by nine inches wide by eight feet six inches long (7" x 9" x 8'-6"); seven inches deep by nine inches wide by nine feet long (7" x 9" x 9'); and seven inches deep by nine inches wide by ten feet long (7" x 9" x 10').

GREEN LUMBER

- A. Crossties shall have a maximum of 1" wane allowed in the rail bearing area (RBA). A maximum of twenty percent (20%) of the entire quantity of ties ordered may be seven inches (7") by eight inches (8") in cross-section with no wane allowed in the RBA. Dimensions specified (depth, width, length and cross-section) are minimum dimensions. Crossties measuring more than 1" deeper, wider or more than 3" longer, at any point, than the specified dimensions shall be rejected.
- B. No undersize ties will be allowed for track construction using resilient fastener tie plates. Crossties shall be 8'6" in length.
- C. Switch timbers shall be 7 inches by 9 inches in cross section with no wane allowed and shall be in lengths as shown on the Contract Drawings.
- D. Ties shall be manufactured from sound, live timber and must be free from any defects that may impair their strength or durability as crossties as further described in this section. Every effort should be made to get the felled timber to mill and milled timber to treatment facility for seasoning as quickly as possible, to avoid wood fiber infection.
- E. Crossties shall be a minimum of 90% oak with the balance from the following species: Beech, Birch, Cherry or Hard Maple.
- F. Switch ties shall be 100% oak.
- G. All ties shall be straight, well sawn on four sides, cut square at the ends, have top and bottom parallel and have bark completely removed. A tie will be considered straight when a straight line along the top, from the middle of one end to the middle of the other end, is entirely within the tie and when a straight line along a side, from the middle of one end to the middle of the other end, is everywhere more than 1-1/2 inches from the top and bottom of the tie. The top and bottom will be considered parallel when any difference in the thickness at the sides and ends is less than or equal to 1/2 inch. Ties shall be free from the following defects:
 - 1. Decay - Ties that show decay of any nature and ties that show strain from being left in the log too long will be rejected. "Blue stain" is not decay and is permissible in any wood.

2. Holes - Ties will be rejected if a large hole, or numerous holes with the net effect of a large hole, is present. A large hole is one exceeding 1/2 inch in diameter and 3 inches deep within the RBA*, or more than one-fourth the width of the side on which it appears and 3 inches deep outside the RBA.
3. Knots - Ties with a large knot, or numerous knots with the net effect of a large knot within the RBA* will be rejected. A large knot is one whose average diameter is greater than one-third (1/3) the width of the surface on which it appears.
4. Shake – A split is a separation of the wood extending from one surface to an opposite or adjacent surface. Do not count the end as a surface when measuring the length of a split. In unseasoned cross ties, a split no more than 1/8 inch wide and/or 4 inches long is acceptable. In seasoned cross ties, a split no more than 1/4 inch wide and/or longer than the width of the face across which it occurs is acceptable.
5. Checks – A check is a separation of the wood due to seasoning which appears on one surface only. Do not count the end as a surface. Ties with continuous checks whose depth in a fully seasoned and/or treated tie is greater than 2 inches in thickness and longer than 48 inches in length of the tie will be rejected.
6. Split - A tie will be rejected if a split exceeds 5 inches long or 1/2 inch wide.
7. Slanting Grain - A tie will be rejected if a slant in grain in excess of 1:15 is present, except in the case of woods with interlocking grain.
8. Wane - Excessive wane (defined as 1" and/or as specified by AREMA Chapter 30) will be cause for rejection of the tie.

* Rail Bearing Area – (RBA) – The area of the tie between 20 inches and 40 inches from its middle.

H. Anti-splitting gang nail end plates shall be installed on both ends of 100% of the green crossties prior to seasoning. End plates will be applied by a mechanical device capable of squeezing crosstie ends together to eliminate any splits and restore the crossties to their original, milled dimensions prior to application. End plates to be manufactured from 18-gauge hot-dipped galvanized steel plate, with nail teeth at least 3/8 long capable of penetrating oak to their full depth. End plates shall be 6" x 7" and centered on the ends of the crossties. End plates shall be embossed along the plate on both 7" sides in letters a minimum of one-eighth of an inch (1/8") in height. Embossing shall include the following:

1. Massachusetts Department of Transportation – MADOT
2. The last two digits of the year treated – 16
3. Crosstie producer's name or symbol – XX Co.

I. The identification brand on the end plate should appear as: MADOT-16-XXCo. and shall be positioned along the plate on the 7 inch side.

SEASONING

- A. Crossties shall be air seasoned prior to treatment. Ties shall be stacked for seasoning in accordance with AREMA Manual of Railway Engineering, Volume 1, Chapter 30, Article 3.5.6.2. Seasoning shall continue for at least 12 months and no more than 18 months.
- B. In the absence of air seasoned crossties, the Boulton drying process may be used. If the Boulton process is used, conditioning should continue until moisture removal rate indicates a percent moisture retained equal to a 12 month air dried crosstie, but not less than 45 percent by weight.
- C. A minimum of 20 borer cores per treatment charge shall be taken of seasoned ties to determine that adequate drying has taken place.
- D. The borer cores shall be taken mid-way between the ends and mid-way between the top and bottom surfaces of the tie. Three 3-inch borer cores shall be taken to determined moisture content.

PRESERVATIVE TREATMENT

- A. Prior to treatment, anti-splitting plates must be checked by the treating facility to ensure that plates are firmly imbedded in the tie. If plates are found to be loose or not flush against the end of the tie, plate shall be firmly pressed against the tie before treatment begins.
- B. Cross tie treatment shall be to retention of seven pounds or to refusal of 60/40 creosote coal tar solution per cubic foot of timber in accordance with the AREMA Manual, Specifications for Treatment, Section 3.7.2.1.2, Empty Cell Process.
- C. A minimum of 20 borings shall be taken per charge after treatment to determined proper penetration.

INSPECTION OF CROSSTIE

- A. Crossties must be inspected as specified in the AREMA Manual for Railway Engineering, Volume 1, Chapter 30, Part 3. Inspection and testing shall be done in accordance with AREMA Specifications prior to crosstie shipment by an individual or individuals with a minimum of five (5) years of experience inspecting and certifying the manufacture and treatment processes of timber crossties.
- B. Inspections protocols will be conducted as follows:
 - 1. Green crossties shall be inspected and certified at the time of delivery, prior to seasoning. Dry ties will be subject to inspection after seasoning and before treatment.
 - 2. Seasoned crossties will be subjected to inspection, prior to treatment, by examination of the top, bottom, side and end faces of each crosstie. Crossties are to be graded independently, not in association with other lots.
 - 3. Seasoned crossties shall be inspected by taking a minimum of twenty (20) boring cores per treatment charge to determine if the specified drying level has been achieved. Boring cores shall be taken midway between the ends of the crosstie. Three inch (3") diameter boring cores shall be taken to evaluate moisture content.

4. Anti-splitting plates that are found to be loose or not firmly against the end of the tie will be cause for rejection of the tie.
5. Following treatment, crossties shall be inspected for specified treatment solution penetration by taking a minimum of twenty (20) boring cores per treatment charge.
6. Inspector will make a close examination of the top, bottom, sides and ends of each tie. Each tie will be graded independently without regard for the grading of the others in the same lot. Ties covered with ice, or too muddied for ready examination, will be rejected. The responsibility and expense for the inspection described above will be borne by the manufacturer.
7. Treated crossties will be inspected upon delivery and prior to installation by Contractor.

SUBMITTALS

- A. Prior to shipment of crossties to Contractor, the crosstie manufacturer shall submit inspection reports certifying that all required tests and inspections (by inspection protocols) have been made and that the crossties being shipped to Contractor are in full compliance with AREMA specifications and as specified herein.

SHIPMENT

- A. Crossties shall be bundled in groups of twenty-five (25) pieces per bundle in a configuration of five (5) rows of five (5) on edge. Bundles shall be banded using a minimum 2-inch heavy duty steel bands per bundle.
- B. Switch Timbers shall be bundled in groups of twenty (20) pieces of 9 to 14 foot lengths and 15 pieces of 15 to 17 foot lengths per bundle, in a configuration of five (5) rows of four (4) on edge. Bundles shall be banded using a minimum 2-inch heavy duty steel bands per bundle.
- C. Bundles of crossties shall be placed atop wood dunnage on the bottom of the transportation vehicle and between tiers to facilitate unloading.

CONDITIONS OF ACCEPTANCE

- A. Crossties that do not fully meet the requirements of these Specifications shall be rejected, removed from MassDOT property (if rejected following shipment) and replaced at no additional costs to MassDOT. Cause for rejection shall include, but not be limited to: under-dimension crossties (seasoned and treated crossties must measure a minimum of 7" x 8" and comprise no more than 20% of the total population in the order); the balance of the population (seasoned and treated) must be no more than 1/4" under-dimension from nominal size (7" x 9"); crossties not meeting straightness criteria or having excessive (relative to specified) checks, splits, wane, knots, etc.; any damage to crossties occurring during transport and/or handling prior to acceptance by MassDOT. Improperly applied or loose anti-splitting devices are also grounds for rejection if they are not repairable (at the crosstie supplier's expense) to the satisfaction of MassDOT. Any crossties rejected by MassDOT shall be segregated from the rest of the order and arrangements made by the supplier to band them in bundles for return and replacement.

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

DISTRIBUTION AND INSTALLATION OF CROSSTIES

CROSSTIE SPACING

- A. New crossties shall be installed at a nominal crosstie spacing of 22" except space ties at 18" within grade crossings, or as directed by the MassDOT (Owner's) Authorized Representative or Pan Am Southern, LLC (Railroad)

CROSSTIE PLACEMENT

- A. New crossties shall be installed perpendicular to the centerline of the track and in-line with the existing ends of crossties on the line side. The distance from the end of the crosstie to the field side of the base of rail on the line side shall be $18\frac{1}{2}" \pm 1\frac{1}{2}"$. The line side for tie installation shall be the right rail headed north.

SPIKING PATTERN

- A. Each newly installed crosstie shall be spiked in accordance with the MassDOT MW-1, Section 127.3. Contractor shall ensure that the minimum specified number of spikes is installed on all new and existing ties in tangents and curves.

CROSSTIES INSTALLED AT JOINTS

- A. Joint ties shall be installed so that spikes will not be driven within 2" of the ends of joint bars. Spikes shall not be driven in the slots of slotted joint bars.

CROSSTIES INSTALLED AT INSULATED JOINTS

- A. At locations where spikes shall be installed at insulated joints, rail holding shall be installed backwards (bill of the track spike facing away from the insulated joint). Tie plates shall not be installed directly underneath the center of insulated joints. A minimum of 3" of clearance is required from the edge of a tie plate to the centerline (insulation post) of the insulated joint.

TAMPING AND DRESSING OF BALLAST

- A. Contractor shall tamp all newly installed crossties so they rest firmly against the base of the rail prior to the installation of the tie plate. In addition, all crossties not designated for replacement shall be tamped by Contractor as part of the tie installation process.
- B. Tamping of all crossties shall not lift existing track and existing track geometry shall be preserved. All crossties are to be tamped sufficiently as to not allow any vertical rail deflection under train load at the conclusion of each work shift.
- C. The ballast must be dressed and broomed so the cribs are filled and a defined shoulder exists.

TRACK GAGE

- A. All new crossties shall be installed with $56\frac{1}{2}" (\pm 1\frac{1}{8}")$ gage. The Gager should be on at all times while the Spiker is in operation.
- B. Contractor shall use a steel track gage is during the installation of crossties.

- C. Crossties that are not replaced shall have 56-1/2" ($\pm 1/8$ ") gage. If it is determined that it is necessary to remove existing spikes in crossties not designated to be changed in order to meet gage transition requirements set forth in MBTA MW-1, Section 53.0, the following shall apply:
1. All crossties to be re-spiked as part of the gaging process shall be plugged with a Railroad approved plugging compound by Contractor before re-spiking.
 2. Gaging work in this contract shall be incidental to installation of crossties.

USE OF A LIQUID PLUGGING COMPOUND

- A. Contractor shall use a Railroad approved chemical formulation for plugging crossties not designated for replacement. Such compound shall have the equivalent or greater characteristics of the Willamette Valley Company SPIKEFAST® ES-50 RM formula. It is Contractor's responsibility to ensure that the plugging compound is being applied in a manner that is consistent with the chemical manufacturer's instructions. Spike holes shall be filled in completely with the approved plugging compound. Furnishing and installing liquid plugging compound for all work in this contract shall be incidental to installation of crossties/timber.

FINISHED CROSSTIE CONDITIONS (FOR FINAL INSPECTION AND PAYMENT)

- A. The following items must be completed by Contractor in order for payment to be made for tie installation work:
1. New crossties shall be installed complete with new resilient rail fastener plates, resilient rail fasteners, screw spikes, and track spikes as required. Track shall be ballasted, tamped, regulated and dressed.
 2. A minimum of 12" of ballast shoulder beyond the end of tie, even with top of tie, then sloped at 2:1 or conforming to existing shoulder as directed by the Owner's Authorized Representative or Railroad.
 3. All ballast shall be removed from the top of crosstie, base of the rail, and track plates and finish no higher than the top of tie and no lower than 1" below top of tie following installation of crossties.
 4. Each new crosstie, as well as all other ties in track, shall be carefully mechanically tamped (multiple squeezes may be required) as part of the tie installation process.
 5. Tamping of all crossties shall not lift existing track nor allow any vertical rail deflection under train load at the renewed crosstie or existing crosstie locations at the conclusion of the work shift.
 6. Existing track geometry shall be preserved.
 7. Field shoulder of the tie plate shall be tight up against field side of running rail.
 8. Crosstie and tie plate shall be perpendicular to the running rail.
 9. Tie plates shall be centered on the crosstie. Plate overhang over the edge of the crosstie is not permitted.

10. Track gage shall be 56 ½" +/- 1/8".
11. Spikes in new crossties shall be driven down to 1/8" to 3/16" above the rail base.
12. All spikes on existing crossties shall be driven down to 1/8" to 3/16" above the rail base.
13. No spike heads will be allowed under base of rail or base of joint bars. Spike heads shall be adjusted accordingly.
14. No ballast allowed between base of rail and tie plate.
15. No ballast allowed between the tie plate and top of crosstie.
16. All of the above items are considered to be incidental to the installation of crossties.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

FINAL SURFACE AND ALIGN TRACK

GENERAL

- A. At the conclusion of the Project's associated trackwork, Contractor shall perform surface and alignment of all tracks within the project limits using approved on-track equipment. A surfacing lift of 2" to 3" shall be made to completed constructed or rehabilitated track. For tie replacement/installation projects, a skim lift of the entire track section subject tie installation shall be performed to resolve vertical deviations in the track after all ties have been installed.
- B. A production Mark IV Tamper or approved equal is required for this work.
- C. Surface and lining of all tracks must meet FRA Class 2 geometry criteria.
- D. Surface and lining of all turnouts, at-grade crossings and 100' at-grade crossing approaches must meet FRA Class 5 geometry criteria.
- E. Contractor shall tamp, surface and align track working away from any open deck bridge. DO not surface into the bridge
- F. Following this work, Contractor shall perform Quality Control (QC) work to correct track defects created by the surfacing and lining work. QC corrections will address defects and include high spikes, tie plates not centered, plate shoulder or other object (stone, spike head, etc.) bearing under rail base, and down ties.
- G. Both sides of all switches and at-grade crossings within work limits shall be surfaced, lined and tamped. Track surface shall be run out at least 100 feet beyond switches and the ends of the re-alignment areas or as directed by Pan Am Southern, LLC (Railroad).
- H. Following the completion of surfacing, lining and tamping, Contractor shall plow/sweep remaining ballast so that all track is completely swept, all cribs are filled to at least 1" below top of tie, no ballast remains on the top of ties, and all areas outside switches are smooth and level.

EXECUTION

- A. Tamping operations shall be performed with an approved 16 tool vibratory squeeze type power tamper with a liner attachment. The power tamper shall have tamping tools with a tamping tip of sufficient area to tamp each tie to the satisfaction of Engineer. Tamping tips shall be repaired or replaced after 30% wear of the working surface.
- B. Cross ties and switch timbers shall be tamped from a point 15 inches from the gage side of each rail to point 15 inches from the field side of each rail on both ends of the tie. The center of each tie shall also be tamped within the limits of paved areas. Tamping will not be permitted at the center of tie outside of paved areas. Both ends of the tie shall be tamped simultaneously and tamping inside and outside of the rail shall be done at the same time. All cross ties shall be tamped tightly to provide good bearing against the base of rail after the track is raised to a true surface. All "down" ties shall be brought up to the base of rail and machine tamped by Contractor before final acceptance. Tamping of track in snow and frozen ballast conditions will not be permitted.

- C. Ballast shall be unloaded only in the amount required for the final track raise and for ballast section restoration which shall include shoulder restoration. Contractor shall distribute the stone ballast in sufficient quantity for tamping the track and for restoring the ballast section which shall conform to the typical sections in MassDOT MW-1. Contractor shall avoid mixing sod, vegetation, and other foreign matter onto the track structure or shoulders for the purpose of tamping or dressing the ballast section. All track work constructed and rehabilitated shall be finally surfaced and aligned to the curvature and elevations shown on the Project Plans.
- D. Deviation from smooth or uniform profile on either rail at the mid-ordinate of a 62 foot chord may not exceed $\frac{1}{4}$ inch. Deviation for zero cross level on may not exceed $\frac{1}{4}$ inch. The difference or change in cross level between any two points 62 feet apart may not exceed $\frac{1}{4}$ inch. Deviation from uniform or smooth alignment between any two points less than 62 feet apart may not exceed $\frac{1}{4}$ inch.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

GRADE CROSSING (RUBBER RAIL SEAL)

GENERAL

- A. The work specified in this Section consists of furnishing and installing Rubber Rail Seal and hot mix asphalt grade crossings. Rubber Rail Seal shall be installed on both gage and field side of rail at locations indicated on the Contract Plans or as Directed by the Engineer.
- B. The Rubber Rail Seal shall provide a flexible seal between the rail and the hot mix asphalt (HMA) surface material. Track structure, including rail, OTM, ties, and ballast must be in excellent condition. Final line, surface, and tamping must be completed prior to the installation of Rubber Rail Seal. This work shall be done at the locations indicated in the contract documents or where directed by the Engineer.
- C. The installation of Rubber Rail Seal grade crossings includes:
 - 1. Preparation of the installation site.
 - 2. Construction of at-grade crossing track.
 - 3. Rubber Rail Seal and HMA installation.

The above construction is encompassing and includes all pertinent trackwork related items associated with track construction such as surfacing, lining and gauging and all other operations necessary to construct an acceptable completed track structure.

SUBMITTALS

- A. Pre-construction survey plans for review and approval to MassDOT/Pan Am Southern, LLC for each grade crossing location. The plans are to include, at a minimum: work limits; excavation limits; rail joint locations, proposed track line and grade, proposed road grades, drainage, new conduit location, as well as existing: rail joint locations; track line and grade; road grades; drainage; signaling equipment; street markings, sidewalks and all other pertinent information.
- B. Post-construction, hard copy and CAD, as-built plans to MassDOT/Pan Am Southern, LLC for each grade crossing location upon completion of the work. The as-built plans are to include, at a minimum, final: rail joint locations, track line and grade, road grades, drainage location and means, new conduit location, existing conduit; signaling equipment; street markings, sidewalks and all other pertinent information.
- C. Detailed description of construction procedures for the Rubber Rail Seal and asphalt grade crossing to be installed.
- D. Brochures and Manufacture's literature on the Rubber Rail Seal product and installation.

SITE PREPERATION

- A. Coordinate with MassDOT/ Pan Am Southern, LLC and all Authority(s) Having Jurisdiction (AHJ) responsible for the crossing for all street and road closures prior to closing. Proper barricades must be placed at all crossings during the time that they are closed to prohibit vehicles from entering the

work zone. All state and local regulations must be met in the erection and installation of these barricades.

- B.** Develop and submit a traffic management plan to the State, Town and/or Municipal Authority(s) Having Jurisdiction (AHJ), Pan Am Southern, LLC and MassDOT for review and approval for each at-grade crossing location.
- C.** Coordinate with the State, Town and/or Municipal Authority(s) Having Jurisdiction (AHJ) for each crossing and secure all necessary permits, police details, traffic signage, etc. necessary for the work. The Contractor is to provide to Pan Am Southern, LLC and MassDOT confirmation and evidence of notification and required permits for each at-grade crossing.
- D.** Premark each at-grade crossing, contact and coordinate with Dig Safe and provide to Pan Am Southern, LLC and MassDOT confirmation and evidence of Dig Safe notification and ticket number for each at-grade crossing before any excavation work takes place.
- E.** Locating, protect and preserve all existing utilities, conduits, cabling, crossing signals and structures, known and unknown, within the grade crossing construction work areas.
- F.** Coordinate with the Railroad and utility owner(s) of any utility encountered prior to, or during, construction.
- G.** Coordinate with the operating Railroad(s) for the protection of any railroad crossing signal systems and proper pre-construction train traffic signaling requirements.

QUALITY CONTROL

- A.** Manufacturer's Qualifications:
 - 1. Have Rubber Rail Seal components fabricated by a recognized manufacturer regularly engaged in the production of specified items.
- B.** Track Tolerances: Refer to Section GENERAL TRACK CONSTRUCTION for track tolerances at crossing within ballasted track. Prior to installing Rubber Rail Seal and placing HMA, the track shall be brought within acceptable tolerances.

RUBBER RAIL SEAL MATERIAL

- A.** Rubber Rail Seal crossing sections are to be furnished by the track foot (TF), consisting of two (2) gage side rail seal sections and two (2) field side rail seal sections and; all tools and associated hardware required for the installation of the Rubber Rail Seal Rubber Rail Seal shall be manufactured to fit the rail section to be crossed.
- B.** Rail Seal shall be designed to fit over the rail fastening system used for the Project as specified in section GENERAL TRACK CONSTRUCTION or as directed by the Engineer.
- C.** Gage side Rail Seal shall be formed to fit snugly against the web of rail section in crossing and shall provide a maximum 2 ½" wide x 1 ½" flangeway meeting ADA requirements. Gage side rail seal shall be formed with full bearing under the rail head.

- D.** Field side Rail Seal section shall be formed to fit snugly against web of rail and against the face of the rail head in the crossing.
- E.** Rubber Rail Seal shall be fabricated from virgin rubber to have an electrical resistance of 10 Mega-Ohms at 500V DC. Rubber shall not be fabricated from recycled material.
- F.** Furnish Rubber Rail Seal; Polycorp Epflex Railseal, HiRAIL RS Rail Seal, Rail Seal by International Track Systems, Inc. or approved equal in accordance with requirements of this Project.

RUBBER RAIL SEAL GRADE CROSSING CONSTRUCTION

- A.** Break existing rail joints in the track at four points on either side of the crossing for each track in preparation for crossing demolition. If it is determined by MassDOT/Pan Am Southern, LLC that the nearest joint is beyond a reasonable distance from the crossing, the Contractor is to cut and drill the rail for new joint locations. The joints to be broken, and/or any new joint locations, will be determined in the field by MassDOT/ Pan Am Southern, LLC personnel.
 - 1. If grade crossing is located in Continuously Welded Rail (CWR) territory, or the Engineer determines the crossing rails to be susceptible to thermal influence, the following shall apply: Preventative Rail Anchoring (PRA) shall be installed for a minimum distance of two hundred track feet (200 TF) from the proposed rail cut-in locations in both directions prior to removing any existing track structure and cutting of the rails. PRA consists of fully box anchoring each tie for two hundred track feet (200 TF) in accordance with MassDOT MW-1, section 125.1, C., (1), c).
- B.** The Contractor is to saw cut the roadway pavement as shown on the Contract Plans or as directed by MassDOT/Pan Am Southern, LLC (Typically fifteen feet (15') from track centerline in both directions).
- C.** Remove all existing pavement, wooden crossing material, rubber crossing material, steel material, rails, OTM, crossties, ballast and subgrade material from within the grade crossing excavation limits as shown on the Contract Plans or as designated by MassDOT/Pan Am Southern, LLC.
- D.** Excavate a trackbed "Box" to the dimensions indicated in the Special Provisions or as directed by MassDOT/Pan Am Southern, LLC. (Typically twelve feet wide and twenty-eight inches deep from TOR (12' x 28" x Length))
- E.** Load-out, remove and dispose of all excavated wood materials. Defective wood material is to be taken to a MassDOT approved disposal site specifically licensed for the processing of creosote treated railroad crossties and be disposed of in accordance with EPA requirements. Crossties deemed reusable shall be neatly stacked, bundled and for deliver (typically by Contractor) to a MassDOT/ Pan Am Southern, LLC Storage Facility within a seventy-five (75) mile radius of the crossing as directed by MassDOT/ Pan Am Southern, LLC.
- F.** Load-out, remove and dispose of all excavated asphalt, concrete and rubber material. Excavated asphalt, concrete and rubber material is to be disposed of in accordance with State, local and Mass DEP requirements.

- G.** Salvaged rail and OTM shall be delivered to a Pan Am Southern, LLC or MassDOT Storage Facility located within a 75 mile radius of the crossing. The salvaged rail and OTM shall be stockpiled together at the storage facility as directed by MassDOT/ Pan Am Southern, LLC.
- H.** Construct ballasted track at grade crossings to the alignment and profile indicated on, and in accordance with, the Contract Drawings.
- I.** Joints shall fall a minimum of fifteen feet (15') outside the limits of the crossings. Field weld any rail joints that would fall within the limits of the rail seal installation in accordance with section WELDING OF RAIL.
- J.** Ballast height must be retained at one inch (1") below rail base before and after crossing has been placed in service.
- K.** Clean all stone and debris from crosstie, plates and rail surfaces which will contact the Rail Seal prior to installation.
- L.** Install clamps to hold the rail seal tight against the rail as required in each tie crib within the limits of the crossing per manufacturer's specifications. Clamps must be attached prior to the placement of the HMA pavement.
- M.** Place HMA pavement to the limits shown on the Contract Plans; as indicated in section HOT MIX ASPHALT (HMA) CROSSING MATERIAL and as specified in this section.
- N.** HMA shall be placed in lifts of two inches (2") minimum and four inches (4") maximum. Care shall be taken during compaction of asphalt to prevent damage to hold down clamps or Rubber Rail Seal. HMA shall be rolled parallel to the rail until the final lift and compaction. Final lift of HMA shall be level with the top of rail between gage lines and for a minimum of thirty inches (30") from the field side of the rail.
- O.** HMA shall extend a minimum of two feet (2') beyond the end of the rail seal and then taper down from top of rail to top of tie at a 3:1 slope. A two inch by two inch (2" x 2") flangeway shall be maintained in the HMA through the gage side of the rails.
- P.** Slope edge of paving to return to original edge of paving alignment.

MEASUREMENT AND PAYMENT

- A.** No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of Work to which they pertain.

END OF SECTION

TRACK APPURTENANCES

GENERAL

- A. This Section specifies the furnishing and installation of hinged wheel stops and the installation of sliding block derails and hinged block derails.

SUBMITTALS

- A. Detailed description of construction procedures for the Wheel Stops to be installed.
- B. Brochures and Manufacture's literature on the Wheel Stop product and installation.
- C. All submittals will be reviewed for general conformance with the intent of the Contract Documents. This review will not relieve the DB Entity of final responsibility for the means, methods, procedures and sequences to be utilized.

PRODUCTS

- A. Wheel Stop
 - 1. Wheel stop shall be Type 430F as Manufactured by Western-Cullen-Hayes or equal. Contractor shall submit proposed type for approval to CM).
- B. Derails
 - 1. Sliding Block Derail and Hinged Block Derails will be supplied by MassDOT and installed by Contractor.
 - 2. Refer to MBTA Book of Standard Plans Drawings 3000 and 3004, the MBTA Commuter Rail Design Manual, and MBTA Material Specification 9215.

EXECUTION

- A. Wheel Stops
 - 1. Installation of wheel stops shall be in conformance with manufacturer's recommendations and specifications.
- B. Derails
 - 1. Installation of Derails shall be in conformance with MBTA Book of Standard Plans Drawings 3000 and 3004, the MBTA Commuter Rail Design Manual, and MBTA Material Specification 9215

MEASUREMENT AND PAYMENT

- A. No separate measurement or payment will be made for work required under this Section. All costs in connection therewith will be considered incidental to the item of Work to which they pertain.

END OF SECTION

CLEANUP AND DISPOSAL OF DEFECTIVE CROSSTIES & TIMBERS

DESCRIPTION

- A. The work specified in this section shall include the dispose of removed crossties, and other old crossties and timbers from within the Railroad Right of Way.

DISPOSAL REGULATIONS

- A. Wood materials are to be disposed in accordance with local, State and Federal regulations. Contractor shall notify the MassDOT (Owner) and Pan Am Southern, LLC (Railroad) which facility will be used to dispose of crossties. A copy of the Mass DEP certification showing that it is an approved disposal facility along with all weight slips for crossties/timbers sent to an approved facility shall be provided to Railroad and to MassDOT Rail Division (Owner).

DISPOSAL OF OLD CROSSTIES

- A. Contractor is responsible for the cleanup of all crossties and switch timber on the right-of-way including those from previous crosstie installation projects. All old crossties and timbers are to be picked up, bundled (if possible), and disposed of at a Mass DEP approved disposal site as specified in the Special Provisions. Wood pickup is to be done concurrently with installation of crossties.

MEASUREMENT AND PAYMENT

- A. Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

AS-BUILT CONSTRUCTION PLANS

DESCRIPTION OF WORK

- A. This Section specifies the general requirements and procedures for preparing As-Built Construction Plans. As-Built plans are not intended to document final quantities, but are intended to show approved revisions to the contract design including, but not limited to: revised profiles and cross sections; revised typical sections; revised drainage and utilities installations; revised track and signal design; and/or any changes to the demolition and removal items and any other changes to the original design or details.

GENERAL

- A. The survey data shall be obtained by Global Positioning Survey (GPS) and certified by a Professional Land Surveyor registered in Massachusetts.
- B. Contractor shall furnish paper "AS-BUILT" plans, two (2) paper 11x17 bound copies of the completed project plans, and two (2) electronic file in AutoCAD 2016 Civil 3D on a labeled disk or portable USB drive to Engineer. These "AS-BUILT" plans shall be furnished prior to the date of the final acceptance. Engineer will make the original drawings available to Contractor for the making of duplicates for use in preparing the as-built drawings.
- C. The following standards shall be applicable:
1. Text: Text shall be drawn using a STYLE of "L100-XX" (where XX refers to the plotted scale) and a font file of "SIMPLEX" as defined in the AutoCAD survey template provided by the Engineer. The style shall be defined as a "fixed height" style, and have a height of 0.10 times the drawing plotted scale. (i.e. 4.0 for 40 scale plan, 2.0 for 20 scale etc.).
 2. Precision and Accuracy:
 - a. Horizontal Survey:
 - 1) Precision: Horizontal control and surveyed points shall maintain a minimum precision of 1:10,000.
 - 2) Accuracy: No more than 10% of the survey points shall be in error by more than 1/100 inch or 0.25 mm when viewed at the requested scale.
 - b. Vertical Survey:
 - 1) Precision: Vertical Control shall have a maximum error of closure no greater than .075 feet or .02 meters.
 - 2) Accuracy: No more than 10% of elevations when interpolated from a Surface shall be in error of more than 1/2 a contour interval.
 3. Surface Data: The data format shall conform to Autodesk Civil 3D Project files. If the Contractor uses a different software product to create a surface, then the surface must be represented as a TIN (Triangulated Irregular Network) of 3D lines on a separate, distinct layer within the AutoCAD drawing file. 3D faces or 2 dimensional.

- D.** Drawings shall include approved design changes during construction. The plan sheets (or any other “job site record document”) revised after award of contract shall include a complete account and detail of the revisions and design changes. The party responsible for the revisions shall have a Professional Engineer (P.E.) seal each altered plan sheet (or any other “job site record document” with a seal). This documented information is to be part of the As-Built Plan requirements.
- E.** As-built plans shall be neat, legible and of the correct size. MassDOT Rail and Transit Projects and any projects which include Plan, Profile, Cross-Section and Detail Sheets shall be full size. As-built plan size shall match the issued plan set size. In general, if the plan set was issued at 11”x17”, the As-Built shall be 11”x17”.
- F.** All revisions to the original plans shall be delineated in red, located properly on the drawing, they shall be legible and true to scale.
- G.** As-built plan, profile, cross section and detail sheets shall be designated as such by note or stamp “As-Built” in black. As-built plans shall be bound in the same manner as they were issued.
- H.** Changes to the issued design by any outside agency shall have their plans added to the As-built plan set. This includes but is not limited to: encroachment permit projects, enhancements, procurements, inter-governmental agreements (IGA), local public agency (LPA) projects and any other agency, private or public, making changes to the existing infrastructure or design. For each new or relocated utility installed, including those installed or relocated by others in the project area, perform an as-built location survey by coordinates prior to backfilling the excavation.

SUBMITTALS

- A.** The person or agency responsible for the work shall submit to MassDOT (Owner) a set of As- built plans which meet the requirements of this specification.
- B.** A complete digital base plan shall be provided in AutoCAD Civil 3D DWG format Release 2014 or later on a Compact Disk (CD) or portable USB drive, properly referenced to the proper coordinate system. The final As-built plans shall be submitted within forty-five (45) days following the substantial work complete date of the project.

MEASUREMENT AND PAYMENT

- A.** Measurement and Payment of the work items included in this contract are defined under the bid items listed in the Bid Form. All costs associated with the work in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.

END OF SECTION

ALLOWANCES

DESCRIPTION OF WORK

- A. This Section specifies allowances for all services, personnel, labor, materials, and equipment necessary to perform the work as specified herein. Contractor shall include in his bid proposal the allowance for each item listed. Except for when Contractor performs the work, he shall not add any Contractor markups, including overhead and profit, except as noted, to these allowance items.

DEFINITIONS

- A. Risk Allowance – An allowance of contingency funds which is included as a line item in the Contract. The use of this allowance is solely at the discretion of MassDOT and will be authorized only through execution of a Risk Reallocation.
- B. Risk Reallocation – A document executed and issued to the Contractor by MassDOT amending the Contract and reallocating funds from or to the Risk Allowance line item within the Contract without changing the contract value. All Risk Reallocations will be processed in the same manner as Change Orders are processed in accordance with MassDOT's most recent general conditions applicable to construction contractor Change Orders. All provisions contained in the Contract applicable to Change Orders shall also apply to Risk Reallocations.

ALLOWANCE ITEMS

A. Traffic Management Allowance:

1. Allowance of a maximum stipulated sum of \$10,000 for traffic management necessary for the duration of the project. Contractor will be reimbursed for the actual cost for traffic management as determined by the Engineer up to a maximum Allowance of \$10,000.
2. Contractor to coordinate all requests for traffic control with MassDOT contact.
3. For any Work that may impact traffic, the Contractor shall be responsible for the scheduling and coordination of the Work with the Railroad, municipality, any affected abutters, and MassDOT. All traffic management arrangements shall be the responsibility of the Contractor including all advance notification that may be required and all signage, traffic barricades and police details that may be necessary. Streets and driveways adjacent to the work area shall remain open at all times.

B. Environmental and Erosion and Sedimentation Control Allowance:

1. Allowance of the stipulated sum of \$10,000 for work related to any required erosion and sedimentation control measures and for any unforeseen soil conditions encountered during excavation operations. Contractor will be reimbursed for the actual cost of performing the work required by the Environmental Permit(s) as determined by the Engineer up to a maximum Allowance of \$10,000.

C. Utility Allowance:

1. Allowance of a maximum stipulated sum of \$10,000 for reimbursement of costs incurred by utility companies in conjunction with this Project; for coordination with utility companies; and for utility work required in conjunction with this Project. Contractor will be reimbursed for the actual cost for utility work as determined by Engineer up to a maximum Allowance of \$10,000.

D. Railroad Flagger Allowance

1. Allowance of a maximum stipulated sum of \$200,000 for a railroad flagger provided by the Railroad necessary for the duration of the project. No Work will be permitted by the Contractor without the Railroad flagger being present. Each workday will begin with the required Job Briefing, which will be given by the Railroad flagger. The Contractor shall be responsible for coordinating their Work with Railroad and retain the flagger service from the Railroad. Contractor will be reimbursed for the actual cost for the service provided by the Railroad flagger, based on paid invoices to the Railroad, up to a maximum Allowance of \$200,000

E. Risk Allowance:

1. Allowance of the stipulated sum of \$200,000 to address unforeseen issues that may occur on the project. MassDOT has established an allowance of contingency funds to incorporate Unforeseen Changes in the Work. The use of this allowance to incorporate these Unforeseen Changes is solely at the direction of MassDOT and use of this allowance is authorized only through execution of a Change Order due to unforeseen issues.

MEASUREMENT

- A. Allowance will be made to reimburse Contractor for work and materials performed and supplied by Contractor and others as specified herein and as further specified in the applicable Construction Specifications Sections and/or Bid Form.

PAYMENT

- A. Before beginning work under any allowance, Contractor shall request an itemized written estimate of cost from the utility companies, private firms, subcontractors, and City and State agencies for the work to be performed. Contractor shall submit these written estimates to MassDOT for review and approval. For work performed by Contractor, she/he shall be reimbursed in accordance with the requirements specified under this Section shall be included in the bid price for the respective bid item.
- B. Payment for allowances will be based on Time and Material, receipted invoices and signed receipts, without charges for Contractor overhead and profit (except when the Contractor performs the work), submitted for the actual work performed.
- C. Allowance will be made to reimburse Contractor for work performed and materials supplied by Contractor and others as specified herein and as further specified in the applicable Construction Specifications Sections.
- D. Contractor shall submit receipted copies of itemized invoices for such work to MassDOT for payment. Payment will be based upon receipted invoices and signed receipts from the utility

companies, private firms, subcontractors or the City and/or State agencies to Contractor, one copy of which shall be submitted to MassDOT.

- E. Each allowance will be adjusted to the actual amount paid by the Contractor for such work done.

END OF SECTION

FY 2025 CAPITAL IMPROVEMENT PROGRAM

EAST DEERFIELD YARD INTERMODAL PROJECT

SPECIAL PROVISIONS

1. MATERIALS FURNISHED BY MASSDOT(OWNER)

A. New 136RE No. 10 Turnouts

Owner/Railroad will furnish new LH 136RE No. 10 turnouts, new LH 115RE No. 10 turnouts & new RH 115RE No. 10 turnout complete with switch timbers for the project. Turnouts are pre-plated and have been pre-assembled prior to delivery. Contractor will be responsible for all loading, unloading, handling and safeguarding of the material prior to installation, and placement, assembly, and installing the No 10 turnout in accordance with the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices.

B. New 136RE No. 8 Turnouts

Owner/Railroad will furnish new RH 136RE No. 8 turnout and LH 136RE No. 8 turnouts complete with switch timbers for the project. Turnouts are pre-plated and have been pre-assembled prior to delivery. Contractor will be responsible for all loading, unloading, handling and safeguarding of the material prior to installation, and placement, assembly, and installing the No 8 turnouts in accordance with the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices.

C. Existing No. 10 Turnouts to be Rehabilitated with Timbers & Frogs

Owner/Railroad will furnish a full set of Timber Cross Ties for existing LH No. 10 and existing RH No. 10 turnouts complete with switch timbers for the project. Owner/Railroad will also furnish any other track material (frogs, etc.) needed for the turnout rehabilitation. Contractor will be responsible for all loading, unloading, handling and safeguarding of the material prior to rehabilitation of the No 10 turnout in accordance with the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices.

D. New Wood Crossties

Owner/Railroad will furnish all new 7" x 9" x 8'-6" wood crossties for installation required in order to meet the specifications and complete the work on this project. This will include Ties for the Intermodal Yard work and also 4,000 new standard crossties for the four Receiving Tracks to be rehabilitated. Contractor will be responsible for all loading, unloading, handling and safeguarding of the material prior to installation, and installing the crossties in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices.

E. Tie Plates & Spikes & Anchors

Owner/Railroad will furnish all new 6" rail base tie plates, spikes new/relay anchors and new/relay 5 1/2" rail base tie plates required for the Project. Contractor will be responsible for safeguarding the material prior to installation and installing the tie plate assemblies in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices. Installation of the plate assemblies is incidental to the type of work being performed. Contractor will be responsible for returning all unused tie plates, spikes and anchors to a MassDOT/ Pan Am Southern, LLC storage facility and Contractor will be responsible for replacing any missing OTM which it fails too properly secure.

F. New Rail – New 136RE

Owner/Railroad will furnish all new 136RE rails in thirty-nine or forty foot (39' or 40') lengths, as required, conforming to the requirements of the AREMA Manual for Railway Engineering, Volume 1, Chapter 4. The Contractor will be responsible for all loading, unloading, handling, storing and safeguarding of the material prior to installation, and installing the rail in accordance with the provisions of the Contract Plans, Special Provisions, the MassDOT MW-1 and AREMA recommended practices. Furnish and install of this item shall be considered incidental to the Project work.

G. Rail – Relay/New 115RE

Owner/Railroad will furnish relay 115RE rails in thirty-nine or forty foot (39' or 40') lengths and there may be some short rails as required, conforming to the requirements of the AREMA Manual for Railway Engineering, Volume 1, Chapter 4. The Contractor will be responsible for all loading, unloading, handling, storing and safeguarding of the material prior to installation, and installing the rail in accordance with the provisions of the Contract Plans, Special Provisions, the MassDOT MW-1 and AREMA recommended practices. Furnish and install of this item shall be considered incidental to the Project work.

H. 136RE & 115RE Joint Bars

Owner/Railroad will furnish all new 136RE joint bar sets and 115RE Relay joint bar sets required to complete the work of this project. Joint bars are to be 6-hole, and meet AREMA Manual for Railway Engineering, Volume 1, Chapter 5, Part 2 standards. Each joint bar set is to include all track bolts, nuts and spring washers. Track bolts, nuts and spring washers shall be of proper size for joining of the rail sections(s) to be installed and conform to AREMA Specifications for Heat-Treated Carbon Steel Bolts, Nuts and Spring Washers, Chapter 4, Sections 3.5 and 3.6. Contractor shall be responsible for all loading, unloading, handling, storing and safeguarding of the material prior to installation. Contractor shall install all joint bars in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1 and the AREMA recommended practices.

I. Compromise Joint Bars

Owner/Railroad will furnish all new and relay 136RE/107RE and 115RE/100NH left-hand and right-hand compromise joint bar sets for permanent installation required to complete the work of

this project. Compromise joint bars are to be 6-hole, forged steel and meet AREMA Manual for Railway Engineering, Volume 1, Chapter 5, Part 2 standards. Each compromise joint bar set is to include all track bolts, nuts and spring washers. Track bolts, nuts and spring washers shall be of proper size for joining of the rail sections(s) to be installed and conform to AREMA Specifications for Heat-Treated Carbon Steel Bolts, Nuts and Spring Washers, Chapter 4, Sections 3.5 and 3.6. Contractor shall be responsible for all loading, unloading, handling, storing and safeguarding of the material prior to installation. Contractor shall install all compromise joint bars in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1 and the AREMA recommended practices. Furnish and install of this item shall be considered incidental to the Project work.

J. Track Bolt Assemblies

Owner/Railroad will furnish all new track bolts, nuts and spring washers for all standard and compromise bolted joints. Railroad requires that each joint installed have a minimum two (2) bolts installed in each rail. Track bolts, nuts and spring washers shall be of proper size for drilling of the rail section to be installed and conforming to AREMA Specifications for Heat-Treated Carbon Steel Bolts, Nuts and Spring Washers, Chapter 4, Sections 3.5 and 3.6. Contractor shall be responsible for all loading, unloading, handling, storing and safeguarding of the material prior to installation. Contractor will install all bolts in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices. Furnish and install of this item shall be considered incidental to the Project work.

K. Signage

Owner/Railroad will furnish signage "Will not clear man on side of car" and installation at Engineers direction on the North tower as the clearance is tight.

L. All Other Material

All other material required for this project shall be furnished by Contractor.

2. MATERIALS FURNISHED BY CONTRACTOR

A. Liquid Plugging Compound

Contractor shall furnish and install all liquid plugging compound necessary for filling spike holes prior to re-spiking tie plates during crosstie and switch timber replacement and re-gaging of track. Contractor shall submit the type of plugging compound to Owner and Railroad for approval prior to use of the compound. The plugging compound shall have characteristics equivalent to, or greater than that of, the Willamette Valley Company SPIKEFAST® ES-50 RM formula. It is Contractor's responsibility to ensure that the plugging compound is being applied in a manner that is consistent with the manufacturer's instructions. Contractor shall be responsible for all loading, unloading, handling and safeguarding of the material prior to installation. Spike holes shall be filled in completely with the approved plugging compound in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices. Installation of the liquid plugging compound for all work in this contract shall be incidental to installation of crossties.

B. Ballast

Contractor shall furnish, distribute, and install all stone track ballast required for this project. Ballast shall meet the requirements of AREMA No. 4, maximum size 1-1/2", durable, full-face fractured granite rock in accordance with AREMA Manual for Railway Engineering, Volume 1, Chapter 1, Part 2. Contractor shall provide ballast from quarries pre-approved by MassDOT. Contractor shall be responsible for all loading, unloading, handling and safeguarding of the material prior to installation. Ballast for all work in this contract shall be installed in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices contained in Volume 1, Chapter 5 of the AREMA Manual for Railway Engineering.

C. Wheel Stops

Contractor shall furnish and install Wheel Stops for the new track construction, in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices contained in Volume 1, Chapter 5 of the AREMA Manual for Railway Engineering.

D. Hinged Block Derail & Sliding Block Derails

Contractor shall furnish and install hinged block derails and sliding block derails for the new track construction, in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices contained in Volume 1, Chapter 5 of the AREMA Manual for Railway Engineering.

E. Subballast

Contractor shall furnish and install subballast on the prepared trackbed subgrade for the new track construction, in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices contained in Volume 1, Chapter 5 of the AREMA Manual for Railway Engineering. Furnish and install of this item shall be considered incidental to the Project work.

F. M2.01.7 DENSE GRADED CRUSHED STONE

Contractor shall furnish and install M2.01.7 DENSE GRADED CRUSHED STONE on the prepared subgrade for the access roadways, in accordance with the provisions of the Contract Drawings, Special Provisions, and MassDOT MW-1. Furnish and install of this item shall be considered incidental to the Project work.

G. Hot Mix Asphalt Pavement

Hot Mix Asphalt (HMA) Pavement complying with the requirements of Special Provisions Section HOT MIX ASPHALT (HMA) PAVEMENT shall be furnished by Contractor. Contractor shall install the HMA at locations and in accordance with the provisions of the Contract Plans, Special Provisions, AREMA Recommended Practices, and the MassDOT MW-1. Furnish and install of this item shall be considered incidental to the Project work.

H. Rubber Rail Seal Crossing Material

Contractor shall furnish and install Rubber Rail Seal Crossing Material for the Paved crossings and the Ballast crossing for the new track construction, in accordance with the provisions of the Contract Drawings, Special Provisions, MassDOT MW-1, and AREMA Recommended Practices contained in Volume 1, Chapter 5 of the AREMA Manual for Railway Engineering.

I. Unused Contractor-Furnished Material

Contractor shall deliver all unused or track material to a secure MassDOT material storage facility within 75 miles of the project sites as directed by the MassDOT.

J. Rejection of Unsuitable Contractor-Furnished Materials

All materials furnished by Contractor found defective shall be recovered by Contractor and removed from the project site at no additional cost to Owner or Railroad.

3. REMOVAL AND DISPOSAL OF TRACK MATERIAL**A. Rail**

All rail recovered from work associated with this project will be sorted by rail section. Any rail deemed re-usable will be delivered to a secure MassDOT/ Pan Am Southern, LLC Storage Facility within 75 miles of the project site and stacked neatly in a location determined by Railroad and in accordance with the provisions of the Contract Plans and Special Provisions. Any rail deemed scrap will be inventoried and placed in a scrap container arranged by Railroad for pick-up by a scrap dealer designated by Railroad. All proceeds from the sale of scrap rail and scrap OTM will go to MassDOT/Pan Am Southern, LLC.

B. Joint Bars, Bolts, Tie Plates, and Anchors (Relay and New)

All re-useable (as determined by MassDOT/Pan Am Southern, LLC) joint bars, bolts, tie plates, and anchors removed as part of the project and not re-used in track construction on the Project will be sorted, inventoried and delivered to a secure MassDOT/ Pan Am Southern, LLC Storage Facility within 75 miles of the Project site and placed in a location within the Facility as directed by Railroad. All OTM deemed un-useable by Railroad shall be picked up and loaded into a scrap container at the direction of MassDOT/Pan Am Southern, LLC for disposal by the Railroad. All proceeds from the sale of scrap rail and scrap OTM will go to MassDOT.

C. Spikes

All spikes removed as part of this project will be recovered as scrap, picked up and loaded into a scrap container at the direction of MassDOT/Pan Am Southern, LLC. All proceeds from the sale of scrap rail and scrap OTM will go to MassDOT.

D. Crossties and Switch Timber

All removed crossties are to be picked up, bundled (if possible) and delivered to an approved disposal site, licensed for processing of creosote-treated railroad ties, to be disposed of in

accordance with EPA requirements. Contractor shall submit copies of the states DEP Certification and weight slips to MassDOT/ Pan Am Southern, LLC from the disposal facility when submitting their invoices. Weight slips shall be clearly marked with the name of the disposal facility, date, tonnage stamp and place of origin.

4. RAILROAD COORDINATION

- A. Pan Am Southern, LLC is engaged in the business of providing freight rail transportation services in Western Massachusetts. Railroad will endeavor to operate its train service to provide track occupancy periods as long as practicable to facilitate efficient trackwork operations. Every work day, Contractor must request approval from the Railroad to begin work activities, and receive prior approval from the Railroad before work activities can begin. In the event of a change, Railroad will work with Contractor to ensure sufficient work windows are available.
- B. Daily meetings will be required between the on-site representatives of Contractor, Owner's Authorized Representative and Railroad to ensure coordination of work activities and train service. During working hours, the track shall remain passable for scheduled freight train moves. All personnel, equipment and material shall be cleared and secured from the track, and all switches shall be normalized and properly lined up as directed by Railroad EIC. At the end of each shift: any in service track must meet FRA Class 2 criteria (Class 5 upon completion of a turnout); all personnel, equipment and materials shall be cleared and secured from the track, and all switches shall be normalized, in working order and secured as directed by Railroad EIC.
- C. The protection of trains, overall safe operations and the protection of workmen and railroad personnel are paramount objectives in executing the Work. All personnel entering the Railroad Right-of-Way must have Roadway Worker Protection (RWP) training in accordance with Pan Am's Roadway Worker Protection Manual and On-Track Safety Program.

5. WORK HOURS and NOISE CONTROL

- A. Municipalities through which Pan Am Southern, LLC operates have varying ordinances which control various activities such as work hours. While Railroad believes that the ICC Termination Act exempts railroad activities from local regulation, Railroad has adopted a "Good Neighbor Policy" and one element of that policy limits, to the extent consistent with efficiency and safety, early morning and late night operations. MassDOT and Pan Am Southern, LLC have established Project work hours of Monday through Friday, from 7:00 AM through 3:30 PM. **Any changes to these days/hours must be approved by MassDOT and the Railroad.** Unless otherwise controlled or allowed by local ordinances, MassDOT and the Railroad shall only consider requests for extended work hours that begin at 6:30 AM and end before 7:00PM daily. Work on weekends and Holidays is encouraged due to no train operations on those days.
- B. Noise control is a part of Railroad's "Good Neighbor Policy" and includes many of the activities discussed above. Noise from trackwork operations shall be controlled to the extent possible, including the sounding of horns and warning devices on railway maintenance and construction machinery. Nothing set forth in this Section shall relieve Contractors from full compliance with FRA and Commonwealth regulations regarding sounding of horns, whistles and/or bells at crossings and approaching and passing through work zones.

6. RAILWAY WORKER PROTECTION

- A. The Railroad strictly adheres to the practice of operating a safe railroad and mandates that all Contractors and their Subcontractors, their Officers, employees, agents and all personnel employed or engaged by them in the performance of the Work or activity while on or adjacent to Railroad property operate and perform all activities in a safe manner and in strict accordance with the Railroad On-Track Safety Program and applicable Provisions of 49 CFR Parts 214, 219 and 243 Railroad Workplace Safety, as promulgated by the Federal Railroad Administration (FRA), in particular:

- Subpart B-Bridge Worker Safety Standards
- Subpart C-Roadway Worker Protection
- Subpart D-Track Roadway Maintenance machines and Hi-Rail Vehicles

See Health and Safety Program for additional information of 49 CFR Parts 219 and 243.

- B. All employees, agents and any personnel employed by and or engaged by the Contractor or his Subcontractors shall attend Roadway Worker Protection training conducted by the Railroad, prior to entry upon Railroad property. RWP training will be held at a designated location prior to initiation of work activities and at other times to accommodate the project schedules. The training will be conducted in English. If the Contractor has employees who may not be able to adequately understand the content of the training in English, then the Contractor will be responsible to provide the appropriate translation to insure that their employees are in compliance with FRA requirements.
- C. Personal Protective Equipment (PPE) requirements are specified in the FRA Regulations and the Railroad On-Track Safety Program. Wearing and use of PPE shall be mandatory and strictly enforced. Failure to adhere to the PPE requirements may be grounds for removal of an individual from Railroad property and prohibition from work. Continual disregard for safety and failure to obey and adhere to safety directives of the Railroad shall be cause for termination of the Contract.

7. RAILROAD PROVIDED SUPPORT SERVICES

- A. Coordination of on-track safety protection for the Contractor and/or Subcontractor's personnel and equipment. Contractors will be provided the following required Railroad Support Services by Pan Am Southern, LLC (Railroad) personnel:
1. Railway Worker Protection ("RWP") training will be provided by Railroad to each Contractor and/or Subcontractor employee on the Project site. RWP Training is mandatory and must be successfully completed prior to accessing the ROW. Contractor will be charged a nominal fee by Railroad for each worker trained in RWP. Contractor shall be responsible for all other costs incurred by workers related to the RWP training.
 2. Daily onsite worker safety inspections by Railroad;
 3. One full time Employee in Charge (EIC) and additional personnel as required supplied by Railroad for the duration of Contractor and/or Subcontractor's presence on site. The EIC will provide the following services to Contractor and/or Subcontractor:

- a. Daily Job Briefings at the beginning of each work day and anytime work conditions change.
- b. Coordination of on-track safety protection for Contractor and/or Subcontractor's personnel and equipment.
- c. Flagging of all train movements through Contractor and/or Subcontractor's work location.
- d. Flagging of all vehicles at highway crossings fouled by Contractor and/or Subcontractor's personnel and/or equipment; and
- e. Daily end of work track inspections required to place track worked on by Contractor and/or Subcontractor back in service.

8. PROJECT OVERSIGHT

- A. At least one full-time MassDOT representative will be present on-site for the duration of the project for the purpose of representing Owner's interests with regard to this project and will provide:
 1. Oversight and Construction Inspection Services;
 2. Act as a liaison between the Railroad and MassDOT;
 3. Daily end of day employee production reporting.

9. CONCURRENT WORK BY OTHERS WITHIN PROJECT LIMITS

- A. Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition Subsection 5.06 shall be supplemented with the following:
- B. Concurrent Work may be in progress in the project area by the MassDOT, the local municipalities, utility companies, another Contractor hired by the owner, or other Contractors hired by private parties. The Contractor is required to coordinate his activities with these parties.
- C. No additional payments will be allowed for any disruption of Work schedule caused by or required to coordinate Work in this Contract with Work to be performed by others, as described above or which may be encountered during the prosecution of the Work.

10. EMERALD ASH BORER ADVISORY

- A. To the extent possible, all trees and brush shall be disposed on site, typically chipped and spread in place. When trees or brush must be removed, such as in urban, or otherwise populated areas, Contractor shall identify proposed location for disposal, and provide written notification to the Engineer for approval. Disposal shall be in city or town of project, or at minimum, within county, of construction operations.

11. NEW INTRODUCTIONS OF INVASIVE PLANTS INTO OR AROUND THE SITE

- A. Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property shall be supplemented with the following:
- B. The Contractor shall ensure that no invasive plant species, as defined and listed by the Massachusetts Invasive Plant Advisory Group, are introduced or moved around the site by construction activities either by improperly cleaned construction equipment or importation of infected materials such as borrow, compost, nursery stock, seed, or hay bales. Corrective measures, if necessary, shall be made by the Contractor as directed by the Engineer. The Contractor shall be solely responsible for all costs associated with ensuring that invasive species are not introduced or moved around the site by construction activities and for all corrective measures required for as long as necessary to eliminate the introduced invasive plant species and prevent re-establishment of same.

12. PREVENTION OF WATER POLLUTION

- A. Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2024 Edition, Subsection 7.02 Prevention of Water Pollution – Sanitary Provisions shall be supplemented with the following:
- B. **Hazardous Spills**

Supplies for cleanup of oil, gasoline and other hazardous materials to be used during the project shall be kept on site at all times. Spills of reportable quantities of hazardous materials shall be reported, as required, to the Department of Environmental Protection (DEP) and cleaned up in compliance with all DEP guidelines.

13. BIDDERS LIST

Pursuant to the provisions of 49 C.F.R. Part 26.11 all official bidders will be required to report the names, addresses and telephone numbers of all firms that submitted bids or quotes in connection with this project. Failure to comply with a written request for this information within 15 business days may result in a recommendation to the Prequalification Committee that prequalification status be suspended until the information is received.

The Department will survey all firms that have submitted bids or quotes during the previous year prior to setting the annual goal and shall request that each firm report its age and gross receipts for the year.

14. BUY AMERICA

The Contract is subject to the Buy America Act, 23 U.S.C. 313, as implemented by the Federal Highway Administration in 23 C.F.R. § 635.410, and the Build America, Buy America Act (Pub. L. No. 117-58, §§ 70901-52), and requires the following,

- (1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, must occur in the United States. Foreign steel and iron can be used if the cost of the materials does not exceed 0.1% of the total Contract cost or \$2,500, whichever is greater. The action of applying a coating to a

covered material (i.e., steel and iron) is deemed a manufacturing process subject to Buy America. Coating includes epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of a material subject to requirements of Build America, Buy America. Steel used for temporary support of excavation, including H piles, soldier piles, and sheeting when the steel is required to be left in place is subject to requirements of Build America, Buy America. Temporary steel, shall remain in place when it falls within the influence zone of the soil supporting any structure or railroad tracks. **This Contract is neither a waiver of 23 U.S.C. 313(a) nor a finding under 23 U.S.C 313(b).**

- (2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and
- (3) all construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. “Construction materials” includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of:
 - non-ferrous metals,
 - plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables),
 - glass (including optic glass),
 - lumber; or
 - drywall.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project but are not an integral part of the structure or permanently affixed to the infrastructure project.

Under 2 C.F.R. § 200.322, the Contractor should, to the greatest extent practicable and consistent with law, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). **The requirements of this section must be included in all contracts and purchase orders for work or products for the Project.** For purposes of this section:

- (1) “Produced in the United States” means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.
- (2) “Manufactured products” means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

15. COMPLIANCE With the National Defense Authorization Act

The “Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment” Regulation (2 CFR 200.216) prohibits the Contractor from using or furnishing the following telecommunications equipment or services:

- Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).
- For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).
- Telecommunications or video surveillance services provided by such entities or using such equipment.
- Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

This prohibition applies to all products manufactured by the aforementioned companies, including any individual components or parts.

By submitting a bid on a project, the Contractor certifies that all work will be in compliance with the terms of 2 CFR 200.216. The Contractor shall submit a COC indicating compliance with the above provisions for all telecommunications equipment or services included in the Contract.

Payment for the item in which the materials are incorporated may be withheld until these COCs are received. Any cost involved in furnishing the certificate(s) shall be borne by the Contractor.

END OF SECTION

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DOCUMENT B00420
PROPOSAL

For: EAST DEERFIELD YARD INTERMODAL PROJECT
COMMONWEALTH OF MASSACHUSETTS

LOCATION:

The work referred to herein is in the City of East Deerfield in Franklin County, in the Commonwealth of Massachusetts, and is shown by the locus map (Document 00331) in the Proposal Pamphlet, the work locations extend as follows:

Per the limits shown on the plans

The contract prices shall include the furnishing of all materials (except as otherwise herein specified), the performing of all the labor requisite or proper, the providing of all necessary machinery, tools, apparatus and other means of construction, the doing of all the abovementioned work in the manner set forth, described and shown in the specifications and on the drawings for the work, and in the form of contract, and the completion thereof within

[275] CALENDAR DAYS upon receipt of a Notice to Proceed, except that if the completion date falls between December 1st and March 15th then the same number of days beyond December 1st will be extended after March 15th.

The Work of this Project is described by the following Items and quantities

The undersigned, identified as Bidder, declares that Bidder has carefully reviewed and examined the Contract Documents including Notice to Bidders, Bid Form, Change Order Form, Special Provisions, General Contract Provisions, Schedule of Prevailing Wage Rates, Track Chart, Roadway Worker Protection Manual and On-Track Safety Program Pan AM Railroad, Pan Am Manual for Track Maintenance and Construction, MassDOT MW-1, Environmental Permits, Plans and other supporting documents (including Addenda thereto), and that Bidder has examined the site upon which the Project Work is to be performed.

After review of all Contract Documents and attesting to understanding and acceptance of same, the undersigned Bidder proposes to furnish all necessary labor, materials (other than those materials stipulated in the Special Provisions as being furnished by Owner), equipment, machinery and tools required to complete the Work as described and specified in the Contract Documents. Bidder understands and agrees that current prevailing wage rates are to be paid in accordance with applicable laws, the General Contract Provisions, and as set forth in this Bid Form.

The undersigned agrees, if awarded the Contract, to substantially complete the East Deerfield Yard Intermodal Project by **Monday, December 1, 2025**; and to complete the work by **Thursday, April 30, 2026**.

This proposal includes a bid deposit in the amount of 5% of the Total Amount of Bid identified herein.

In

submitting this Bid, Bidder represents that:

1. Bidder has examined copies of all the Contract Documents, including the Addenda thereto:
2. Bidder has examined the site and locality where the Work is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules, and regulations) and the conditions affecting cost, progress, or performance of the Work, and has made such independent investigations as Bidder deems necessary to complete this Bid and carry out the Work in accordance therewith.
3. The Bid is based on the prevailing wage rates identified for the Work to be performed as set forth in the Contract Documents, and as required by applicable laws.
4. This Bid is genuine and not made in the interest or on behalf of any undisclosed person, firm, or corporation; the Bid is not submitted in conformity with any agreement of rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for Bidder any advantage over any other Bidder.

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The undersigned further agrees to perform the Work in its entirety in accordance with the Contract Documents within the prescribed time, and to the total and complete satisfaction of Owner (in consultation with their Authorized Representatives), at the identified Unit Prices and Lump Sum Amounts as set forth below:

Project #613915 Contract # 128373				
Location: East Deerfield, MA				
Description: Repair/Rehabilitation of East Deerfield Intermodal Yard				
ITEM #	QUANTITY	ITEM WITH UNIT BID PRICE WRITTEN IN WORDS	UNIT PRICE	AMOUNT
1	1	SCHEDULE OF OPERATIONS AT _____ LUMP SUM		
2	1	PRE-CONSTRUCTION SURVEY & AS-BUILT PLANS AT _____ LUMP SUM		
3	1	MOBILIZATION / DEMOBILIZATION AT _____ LUMP SUM		
4	2,300	EXCAVATION & WASTING OF EXCAVATED MATERIAL AT _____ CUBIC YARD (CY)		
5	3,395	REMOVAL/DEMOLITION OF EXISTING TRACK AT _____ TRACK FOOT (TF)		
6	500	FURNISH & INSTALL NEW SUBBALLAST AT _____ TON		
7	2,400	FURNISH & INSTALL DENSE GRADED CRUSHED STONE AT _____ TON		
8	2,041	INSTALL NEW YARD TRACKS AT _____ TRACK FOOT (TF)		
9	17,250	REHABILITATE EXISTING RECEIVING YARD TRACKS AT _____ TRACK FOOT (TF)		
10	14,000	FURNISH & INSTALL NEW STONE BALLAST AT _____ TON		

11	5	ASSEMBLY & INSTALLATION OF NO.10 TURNOUT AT _____ EACH (EA)		
12	3	ASSEMBLY & INSTALLATION OF NO.8 TURNOUTS AT _____ EACH (EA)		
13	6	REHABILITATE EXISTING NO.10 TURNOUTS AT _____ EACH (EA)		
14	22,034	LINE, SURFACE, TAMP & DRESS TRACK AND TURNOUTS AT _____ TRACK FOOT (TF)		
15	650	CLEAN UP & DISPOSE REMOVED OR SCRAP CROSSTIES & TIMBERS AT _____ TON		
16	1	FURNISHING, ASSEMBLY & INSTALLATION OF SLIDING BLOCK DERAIL AT _____ EACH (EA)		
17	4	FURNISHING, ASSEMBLY & INSTALLATION OF HINGED BLOCK DERAIL AT _____ EACH (EA)		
18	4	FURNISH & INSTALL WHEEL STOPS AT _____ EACH (EA)		
19	366	FURNISH & INSTALL RUBBER RAIL SEAL CROSSING (WITH ASPHALT) AT _____ TRACK FOOT (TF)		
20	347	FURNISH & INSTALL RUBBER RAIL SEAL CROSSING (WITH BALLAST) AT _____ TRACK FOOT (TF)		
21	6100	FURNISH & INSTALL COMPOST FILTER TUBES AT _____ LINEAR FOOT (LF)		
22	150	FURNISH & INSTALL HOT MIX ASPHALT (HMA) PAVEMENT AT _____ TON		
23	1	ALLOWANCE OF TRAFFIC MANAGEMENT AT <u>Ten Thousand Dollars max</u> ALLOWANCE	\$10,000.00	\$10,000.00

24	1	ALLOWANCE FOR ENVIRONMENTAL & EROSION AND SEDIMENTATION CONTROL AT <u>Ten Thousand Dollars max</u> ALLOWANCE	\$10,000.00	\$10,000.00
25	1	ALLOWANCE FOR EXISTING SITE UTILITY WORK AT <u>Ten Thousand Dollars max</u> ALLOWANCE	\$10,000.00	\$10,000.00
26	1	ALLOWANCE OF RAILROAD FLAGGER AT <u>Two Hundred Thousand Dollars max</u> ALLOWANCE	\$200,000.00	\$200,000.00
27	1	RISK ALLOWANCE AT <u>Two Hundred Thousand Dollars max</u> ALLOWANCE	\$200,000.00	\$200,000.00

**The Total Amount of Bid based upon the Contract Documents and proposed Bid Item Unit Prices:
Lump Sum Amounts; and Allowances is:**

TOTAL AMOUNT OF BID _

(Summation of Bid Items 1 – 27)

Written in Words

TOTAL AMOUNT OF BID _

(Summation of Bid Items 1 – 27)

Written in Figures

By submitting this Bid, Bidder specifically acknowledges that:

- (1) The quantities shown on this Bid Form are estimates only and will be used to determine the Total Amount Bid.
- (2) Owner reserves the right to reject any and all bids, or any bid item, to advertise for new proposals for the project, to waive technicalities as to form, or to proceed to do the work otherwise, as may be deemed in the best interest of Owner. Nothing herein shall be construed as depriving Owner of the right to reject any bid when such bid does not fully comply with the specifications for the project or the applicable bidding laws and regulations, or if Bidder is otherwise not qualified or eligible to receive award of the contract. A bid will be considered irregular and will be rejected if it is determined that any of the unit prices are materially unbalanced to the detriment of Owner. The bidder will be required to justify in writing the price or prices bid for the work in question before MassDOT decides to award the contract or reject the bid.
- (3) Bidder has prequalification in Class 1 – General Transit Construction under the MBTA and prequalification for Class 3 – Trackwork under the MBTA as of the bid opening. Subcontractors are to be submitted for approval by MassDOT.
- (4) Subject to the reservations contained in the preceding paragraphs, the contract shall be awarded to the lowest responsible and eligible bidder. The “lowest responsible and eligible bidder” shall mean Bidder who submits a complete bid

in accordance with the requirements of the Bid Documents, and whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work.

(5) The Bid shall remain effective for a period of not less than ninety (90) days.

Bid submitted by _____
Name of Bidder

Signed by _____
Duly Authorized Representative of Bidder Date

1. Schedule of Operations

Bid price to complete a baseline schedule and all monthly progress schedule updates necessary for the Work associated with the East Deerfield Yard Intermodal Project in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards.

2. Pre-Construction Survey and As-Built Plans

Bid price to complete all pre-construction survey, survey plans and as-built plans necessary for the work associated with the East Deerfield Yard Intermodal Project in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Hard copy and CAD as-built plans to be submitted to for MassDOT review and archiving,

3. Mobilization / Demobilization

Bid Price for all mobilization and demobilization of equipment, material and labor resources as required to perform the Project in accordance with the Contract Plans, Special Provisions, MassDOT MW-1 and AREMA Standards. Bid Price to include demobilization of all Contractor resources upon completion of the Work.

(Note – Total mobilization/demobilization price must be less than 5% of the Contract Total Price)

4. Excavation and Wasting of Excavated Material

Bid price to excavate, grade and clear up to 2,300 Cubic Yards (CY) of existing soil, ballast, dirt roadbed and other material to the limits shown on the Contract Plans and as specified in the Special Provisions. Excavated material is to remain within and be dumped and graded within the yard or along the MassDOT railroad right-of-way within five (5) miles of the work site at locations designated by Owner/Railroad as directed by Owner/Railroad. Excavation and wasting of excavated material work shall be performed in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary for the excavation and wasting of excavated material, and for all other incidentals required to finish the work, complete and accepted by Engineer.

5. Removal/Demolition of Existing Track

Bid price to remove, dismantle and stockpile/salvage/dispose of up to 3,395 Track Feet (TF) of existing track as indicated on the Contract Plans. Removed track material deemed salvageable by Railroad shall be delivered to a MassDOT/ Pan Am Southern, LLC storage facility within 75 miles of the project site. Removal, dismantling and stockpile/salvage/dispose of existing track shall be performed in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to remove, dismantle and stockpile/salvage/dispose existing track, and for all other incidentals required to finish the work, complete and accepted by Engineer.

6. Furnish and Install New Subballast

Bid price to furnish, deliver, distribute and install up to 500 TON of new stone subballast as shown on the Contract Plans and as specified in the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to Furnish and Install New Stone Ballast, and for all other incidentals required to finish the work, complete and accepted by Engineer.

7. Furnish and Install Dense Graded Crushed Stone

Bid price to furnish, deliver, distribute and install up to 2,400 TON of new M2.01.7 Dense Graded Crushed Stone as shown on the Contract Plans and as specified in the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to Furnish and Install New Stone Ballast, and for all other incidentals required to finish the work, complete and accepted by Engineer.

8. Install New Yard Tracks

Bid price to construct up to 2,041 Track Feet (TF) of new timber tie, 136 RE jointed rail, ballasted track, including ties, rail and OTM as necessary to the alignments and profiles shown on the Contract Plans and as specified in the Special Provisions. All track materials including 136RE rail, joint bars, compromise joint bars, joint bolt assemblies, timber ties, tie plates for 6" rail base, anchors, and cut spikes are to be supplied by MassDOT. Construction of new yard tracks shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to construct new yard tracks, and for all other incidentals required to finish the work, complete and accepted by Engineer.

9. Rehabilitate Existing Receiving Yard Tracks

Bid price to rehabilitate up to 17,250 Track Feet (TF) of existing timber tie, jointed rail, ballasted track, including ties, rail and OTM meeting the existing alignments and profiles as noted on the Contract Plans and as specified in the Special Provisions. All track materials including relay 115RE rail, relay joint bars, relay compromise joint bars, new joint bolt assemblies, new timber ties, relay tie plates for 5.5" rail base, new anchors, and new cut spikes are to be supplied by MassDOT. Removal of rail, OTM and scrap ties is incidental to this bid item. Rehabilitation of existing yard tracks shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to rehabilitate existing yard tracks, and for all other incidentals required to finish the work, complete and accepted by Engineer. Rail and OTM removal are incidental to Track Rehabilitation.

10. Furnish and Install New Stone Ballast

Bid price to furnish, deliver, distribute and install up to 14,000 TON of new AREMA #4 stone ballast as shown on the Contract Plans and as specified in the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to Furnish and Install New Stone Ballast, and for all other incidentals required to finish the work, complete and accepted by Engineer.

11. Assembly and Installation of No. 10 Turnout

Bid price to assemble and install one (1) new 136RE No. 10 turnout (Left-Hand) in the Intermodal Yard and three (3) new 115RE No. 10 turnout (Left-Hand) & one (1) new 115RE No. 10 turnout (Right-Hand) in the Receiving Yard at locations indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Assembly and installation of new No. 10 Left-Hand (LH) turnouts and new No. 10 Right-Hand (RH) turnout shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. All track materials Bid price shall include all labor, material, equipment, machinery and tools necessary to assemble and install new 136RE No. 10 turnout, and for all other incidentals required to finish the work, complete and accepted by Engineer.

12. Assembly and Installation No. 8 Turnouts

Bid price to assemble and install a total of three (3) new 136RE No. 8 turnouts (two (2) Left-Hand & one (1) Right-Hand) at locations indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Assembly and installation of new 136RE No. 8 Left-Hand (LH) & Right-Hand (RH) turnouts shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to assemble and install new 136RE No. 8 turnouts, and for all other incidentals required to finish the work, complete and accepted by Engineer.

13. Rehabilitate Existing No. 10 Turnouts

Bid price to rehabilitate one (1) existing No. 10 turnout (Left-Hand) in the Intermodal Yard and one (1) existing No. 10 turnout (Left-Hand) & four (4) existing No. 10 turnouts (Right-Hand) in the Receiving Yard at location indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Rehabilitation of existing No. 10 Left-Hand (LH) turnout shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to rehabilitate existing No. 10 turnout, and for all other incidentals required to finish the work, complete and accepted by Engineer.

14. Line, Surface, Tamp and Dress Track and Turnouts

Bid price to line, surface, tamp, and dress up to 22,034 Track Feet (TF) of track and turnouts as shown on the Contract Plans in the Intermodal Yard and the Receiving Yard. Lining, surfacing, tamping and dressing up track and turnouts shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to line, surface, tamp and dress up track and turnouts, and for all other incidentals required to finish the work, complete and accepted by Engineer.

15. Clean up and Dispose Removed or Scrap Crossties and Timbers

Bid price to collect, stockpile, load out, transport and dispose of up to 650 TON of Removed or Scrap Crossties or Timbers within the Railroad Right-of-Way. Bid price shall include all labor, material, equipment, machinery and tools necessary to clear the right of way of removed or scrap crossties as specified in the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards, and for all other incidentals required to finish the work, complete and accepted by Engineer. Disposal of removed or scrap ties and timbers must be to a MassDEP approved facility.

16. Furnishing, Assembly and Installation of Sliding Block Derail

Bid price to furnish, assemble and install one (1) new Sliding Block Derail at location indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Assembly and installation of Sliding Block Derail shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to assemble and install new Sliding Block Derail, and for all other incidentals required to finish the work, complete and accepted by Engineer.

17. Furnishing, Assembly, and Installation of Hinged Block Derail

Bid price to furnish, assemble and install a total of four (4) new Hinged Block Derails at location indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Assembly and installation of Hinged Block Derails shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to assemble and install new Hinged Block Derails, and for all other incidentals required to finish the work, complete and accepted by Engineer.

18. Furnish and Install Wheel Stops

Bid price to furnish and install a total of four (4) new Wheel Stops at locations indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Each Wheel Stop will consist of one pair of wheel stops. The installation of Wheel Stops shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to install new Wheel Stops, and for all other incidentals required to finish the work, complete and accepted by Engineer.

19. Furnish and Install Rubber Rail Seal Crossing (With Asphalt)

Bid price to furnish and install a total of 366 Track Feet (TF) of Rubber Rail Seal Crossing with Asphalt at the locations indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Furnishing and installation of Rubber Rail Seal Crossing with Asphalt shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to assemble and install new Rubber Rail Seal Crossing with Asphalt, and for all other incidentals required to finish the work, complete and accepted by Engineer.

20. Furnish and Install Rubber Rail Seal Crossing (With Ballast)

Bid price to furnish and install a total of 347 Track Feet (TF) of Rubber Rail Seal Crossing with Ballast at the locations indicated on the Contract Plans or as directed by MassDOT/ Pan Am Southern, LLC. Furnishing and installation of Rubber Rail Seal Crossing with Ballast shall be in

accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to assemble and install new Rubber Rail Seal Crossing with Ballast, and for all other incidentals required to finish the work, complete and accepted by Engineer.

21. Furnish and Install Compost Filter Tubes

Bid price to furnish and install a total of 6,100 Linear Feet (LF) of Compost Filter Tubes at the locations indicated on the Contract Plans or as directed by MassDOT/Pan Am Southern, LLC. Furnishing and installation of Compost Filter Tubes shall be in accordance with the Special Provisions, General Contract Provisions, MassDOT MW-1 and AREMA Standards. Bid price shall include all labor, material, equipment, machinery and tools necessary to furnish and install new Compost Filter Tubes, and for all other incidentals required to finish the work, complete and accepted by Engineer.

22. Furnish and Install Hot Mix Asphalt (HMA) Pavement

Bid price to furnish and install up to 150 TON of Hot Mix Asphalt (HMA) pavement for approach aprons to crossings as shown on the Contract Plans and as specified in the Special Provisions, General Contract Provisions, and MassDOT MW-1. Bid price shall include all labor, material, equipment, machinery and tools necessary to furnish and install the HMA pavement for approach aprons to crossings, and for all other incidentals required to finish the work, complete and accepted by Engineer.

23. Allowance for Traffic Management

Allowance of the stipulated sum of \$10,000 shall be include in Contractor's Bid for traffic management practices necessary for the duration of the project. Work to include all services, personnel, labor, materials, permits, equipment, machinery and tools necessary to employ acceptable traffic management practices for the project. Contractor proposal(s) to perform work under this allowance item must be authorized by MassDOT prior to performing the work.

Payment for work will be based upon Time & Material costs utilizing Contractor load rates for the actual work performed. Contractor shall submit receipted copies of itemized invoices for such work to MassDOT for payments. Contractor will be reimbursed for the actual cost of performing any required traffic management practices as determined by Engineer up to a **maximum Allowance of \$10,000**.

24. Allowance for Environmental and Erosion and Sedimentation Control

Allowance of the stipulated sum of \$10,000 shall be include in Contractor's Bid for work related to any required erosion and sedimentation control measures and for any unforeseen soil conditions encountered during excavation operations. Work to include all services, personnel, labor, materials, permits, equipment, machinery and tools necessary for required erosion and sedimentation control measures and to address any unforeseen environmental issues. Contractor proposal(s) to perform work under this allowance item must be authorized by MassDOT prior to performing the work.

Payment for work will be based upon Time & Material costs utilizing Contractor load rates for the actual work performed. Contractor shall submit receipted copies of itemized invoices for such work to MassDOT for payments. Contractor will be reimbursed for the actual cost of performing work related to any erosion and sedimentation control measures and in dealing with any unforeseen environmental issues as determined by Engineer up to a maximum Allowance of \$10,000.

25. Allowance for Existing Site Utility Work

Allowance of the stipulated sum of \$10,000, shall be include in Contractor's Bid for work related to the removal, disposal, replacement, and relocation of existing utilities. Contractor shall protect and preserve the existing utility structures from being damaged during excavation. This allowance is for all services, personnel, labor, materials, permits and equipment necessary to perform the work as specified herein and as shown on the Contract Plans. Contractor proposal(s) to perform work under this allowance item must be authorized by MassDOT prior to performing the work.

Payment for work will be based upon Time & Material costs utilizing Contractor load rates for the actual work performed. Contractor shall submit receipted copies of itemized invoices for such work to MassDOT for payments. Contractor will be reimbursed for the actual cost of performing the existing site utility work required up to a maximum allowance of \$10,000.

26. Allowance for Railroad Flagger

Allowance of a maximum stipulated sum of \$200,000 for a railroad flagger provided by the Railroad necessary for the duration of the project. No Work will be permitted by the Contractor without the Railroad flagger being present. Each workday will begin with the required Job Briefing, which will be given by the Railroad flagger. The Contractor shall be responsible for coordinating their Work with the Railroad and retain the flagger service from the Railroad. Contractor will be reimbursed for the actual cost for the service provided by the Railroad flagger, based on paid invoices to the Railroad, up to a maximum Allowance of \$200,000.

27. Risk Allowance

This Risk Allowance of contingency funds which is included in this Contract is to reimburse Contractor for all services, personnel, labor, materials, and equipment necessary to address unforeseen issues on the project (if required). Contractor shall include this risk allowance cost in his/her bid proposal.

The use of this allowance is solely at the discretion of MassDOT Rail and Transit and will be authorized in writing only through execution of a Risk Reallocation. All Risk Reallocations will be processed in the same manner as Change Orders. All provisions contained in the Contract applicable to Change Orders shall also apply to Risk Reallocations.

MassDOT may at any time at its sole discretion unilaterally issue a Risk Reallocation or Change Order to Contractor for any purpose relating to work under this Contract, including without limitation to address any disagreement between the parties regarding the scope or cost of the work, or whether Contractor has performed in accordance with the requirements of the Contract. A unilaterally issued Risk Reallocation or Change Order need not include a consent or acknowledgement by Contractor. Contractor shall proceed immediately as directed in the unilaterally issued Risk Reallocation or Change Order without prejudice to its rights to assert claims for additional compensation or time.

Payment for work will be based upon Time & Material costs utilizing Contractor load rates for the actual work performed. Contractor shall submit receipted copies of itemized invoices for such work to MassDOT for payments. Once the Risk Reallocation or Change Order is approved Contractor will be able to invoice against the Risk Allowance Bid Item.

(Note – Total Contractor markups are not to exceed 8%)

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DOCUMENT B00421

DOCUMENTS TO BE SUBMITTED BY BIDDERS/SUCCESSFUL BIDDER

FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL PROJECT**Required Documents to be Submitted by Bidder**

The Contractor bidding on this project must be experienced in construction projects involving work on and around an active railroad; railroad track construction; railroad tie replacement; raising, lining and surfacing of railroad track; and heavy civil construction work.

The following bonds, forms, certificates and additional documents must be provided and/or completed and submitted as part of this Bid Form and Contractor's Bid Package:

A. Bid Deposit

1. Bid deposit in the amount of 5% of the bid. The bid deposit shall be a bid bond in a form satisfactory to the Department furnished by a surety company incorporated pursuant to Chapter 175, Section 105 of the General Laws or authorized to do business in the Commonwealth under Chapter 175, Section 106 of the General Laws and satisfactory to the Department; or cash; or a certified check drawn on a responsible bank or trust company (or a treasurer's or cashier's check issued by such bank or trust company), payable to the Massachusetts Department of Transportation.

B. Forms and Certifications

1. Certificate of Non-Collusion
2. Certificate of Independent Price Determination
3. Certificate of Compliance with Massachusetts Employment Security Law
4. Certification of Work in Harmony and OSHA Training
5. Affidavit of Compliance; Out of State Certificate
6. Vote of Corporation; Authorized Signatory
7. Executive Order 481 – Certification
8. Certificate Regarding Wage Rates; Statement of Compliance
9. Bidder's current MBTA Prequalification Certificate for Class 1 – General Transit Construction and Class 3 - Trackwork

C. Additional Documents

1. Preliminary Construction Schedule, including key benchmarks.

2. Approved Drug and Alcohol testing plan in compliance with all statutes and regulations administered by the Federal Railroad Administration (FRA) in implementing the required 49 CFR Part 219 Drug and Alcohol Program.
3. List of Equipment which will be used in the performance of the Work on the East Deerfield Yard Intermodal Project. Please include the following information:
 - Type of Equipment
 - Manufacturer
 - Model
 - Approximate Year
 - Approximate Hours
 - Operator Requirements

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FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL PROJECT

BID BOND

KNOW ALL MEN BY THESE PRESENTS: that we the undersigned,

(Name of Contractor)

(Address of Contractor)

a _____ hereinafter called Principal, and
(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of

_____ Dollars, (\$_____)

for payment of which, well and truly to be made, we hereby jointly and severally bind ourselves,
successors and assigns.

Signed, this _____ day of _____, 20____.

WHEREAS, the Principal has submitted to _____ a certain
BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his or her faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other aspects perform the agreement created by the acceptance of said bid,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which OWNER may accept such BID and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

(Principal)

(Surety)

By: _____

IMPORTANT – An appropriate Power of Attorney, dated the same date as the BOND, and evidencing the authority of the Attorney-in-Fact to act on behalf of the corporation shall be attached to the BID BOND.

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FY 2025 CAPITAL IMPROVEMENT PROGRAM

EAST DEERFIELD YARD INTERMODAL PROJECT

Certificate of Non-Collusion

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph, the word “person” shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

Signature of Authorized Signatory

Name of Company

Date

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FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL PROJECT

Certificate of Independent Price Determination

- A. By submission of this bid or proposal, each Bidder or offeror certifies, and in the case of a joint bid or proposal, each party thereto certifies as to its own organization, that in connection with this procurement:
- a. The process in this bid or proposal have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or offeror or with any competitor;
 - b. Unless otherwise required by law, the prices which have been quoted in this bid or proposal have not been knowingly disclosed by Bidder or offeror and will not knowingly be disclosed by Bidder offeror prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other Bidder or offeror or to any competitor; and
 - c. No attempt has been made or will be made by Bidder or offeror to induce any other person or firm to submit or not to submit a bid or proposal for the purpose of restricting competition.
- B. Each person signing this bid or proposal certifies that:
- a. They are the person in Bidder's organization responsible within that organization for the decision as to the prices being bid or offered herein and that they have not participated, and will not participate, in any action contrary to (A)(1) through (A)(3) above; or
 - b. He or She is not the person in Bidder's or offeror's organization responsible within that organization for the decision as to the prices being bid or offered herein but that he or she has been authorized in writing to act as agent for the persons responsible for such decision(s) and to certify that such persons have not participated, and will not participate, in any action contrary to (A)(1) through (A)(3) above, and as their agent does hereby so certify; and they have not participated, and will not participate, in any action contrary to (A)(1) through (A)(3) above.

(Print Name)

(Company)

(Signature)

(Date)

FY 2025 CAPITAL IMPROVEMENT PROGRAM

EAST DEERFIELD YARD INTERMODAL PROJECT

Compliance with Massachusetts Employment Security Law

In accordance with the provisions of Section 19A(b) of Chapter 151A of the Massachusetts General Laws,

I, _____,
[Name & Title]

signing on behalf of _____
[Name of Company / Employer]

hereby certify that the aforementioned employer has complied with all employment security laws of the Commonwealth of Massachusetts relating to contributions and payments in lieu of contributions.

Signed under the pains and penalties of perjury this _____ day of _____ 2024.

Signature

Notary Public

My Commission Expires

FY 2025 CAPITAL IMPROVEMENT PROGRAM**EAST DEERFIELD YARD INTERMODAL PROJECT****Certification of Work in Harmony and OSHA Safety Training**

- (a) In accordance with the provisions of Massachusetts General Laws Chapter 30, Section 39S, the undersigned certifies under penalties of perjury:
- (1) that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work;
 - (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and
 - (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration.
- (b) Any employee found on a worksite subject to this section without documentation of successful completion of a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration shall be subject to immediate removal.
- (c) The attorney general, or his designee, shall have the power to enforce this section including the power to institute and prosecute proceedings in the superior court to restrain the award of contracts and the performance of contracts in all cases where, after investigation of the facts, he has made a finding that the award or performance has resulted in violation, directly or indirectly, of subsection (b), and he shall not be required to pay to the clerk of the court an entry fee in connection with the institution of the proceeding.

Authorized Signature

Print Name & Title

Company

Date

FY 2025 CAPITAL IMPROVEMENT PROGRAM**EAST DEERFIELD YARD INTERMODAL PROJECT****Certificate of Compliance Issued by Commonwealth of Massachusetts**
Secretary of State to Foreign (Out of State) Corporations

“The Commonwealth and every county, city, town, district, board, commission or other public body which, as the awarding authority, requests proposals, bids or sub-bids for any work in the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or other public works (1) shall not enter into a Contract for the work with, and shall not approve as a Subcontractor furnishing labor and materials for a part of the work, a foreign corporation which has not filed with the awarding authority a certificate of the state secretary stating that such corporation has complied with requirements of section 15.03 of subdivision A of Part 15 of chapter 156D and the date of compliance, and further has filed all annual reports required by section 16.22 of subdivision B of Part 16 of said chapter 156D.” M.G.L. c. 30, Section 39L.

If Bidder is a foreign corporation, it shall attach the certificate issued by the Massachusetts Secretary of State showing its compliance with the foregoing statutes.

SIGNED UNDER THE PENALTIES OF PERJURY THIS _____ day of _____, 20____

Authorized Signature

Print Name & Title

Company

Date

FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL PROJECT

Vote of Corporation; Authorized Signatory

At a meeting of the Board of Directors of _____
[Name of Company]
held on the _____ day of _____, 20____, at which all the Directors were present or
waived notice, it was VOTED, that, _____, who is the duly
[Name of Officer]
elected _____ of this company be and hereby is authorized to execute
[Title of Officer]
contracts, bonds and other instruments in the name of and behalf of said company and affix its corporate
seal thereto; and such execution by said _____ of any contract
[Name of Officer]
or other instrument or obligation in this company's name and on its behalf by such _____
[Title of Officer]
of the company under seal, shall be valid and binding upon this company.

A True Copy Attest:

Clerk _____
[Signature]

[Print Name & Title]

[Business Address]

[Date]

I, _____, hereby certify that I am the Clerk of _____
[Name of Clerk] [Name of Company]
and that _____ is the duly elected _____
[Name of Officer] [Title of Officer]
of said company, and that the above vote has not been amended or rescinded and remains in full force and
effect as of this date.

Clerk [Corporate Seal]

FY 2025 CAPITAL IMPROVEMENT PROGRAM

EAST DEERFIELD YARD INTERMODAL PROJECT

Executive Order 481

INSTRUCTIONS

Executive Order 481 applies to all state agencies in the Executive Branch, including all executive offices, boards, commissions, agencies, departments, divisions, councils, bureaus, and offices, now existing and hereafter established. As it is the policy of the Executive Branch to prohibit the use of undocumented workers in connection with the performance of state contracts, all contracts entered into after February 23, 2007 require that contractors, as a condition of receiving Commonwealth funds under any Executive Branch contract, make the following certification:

CONTRACTOR CERTIFICATION

As evidenced by the signature of the Contractor's Authorized Signatory below, the Contractor certifies under the pains and penalties of perjury that the Contractor shall not knowingly use undocumented workers in connection with the performance of all Executive Branch contracts; that pursuant to federal requirements, the Contractor shall verify the immigration status of all workers assigned to such contracts without engaging in unlawful discrimination; and that the Contractor shall not knowingly or recklessly alter, falsify, or accept altered or falsified documents from any such worker(s). The Contractor understands and agrees that breach of any of these terms during the period of each contract may be regarded as a material breach, subjecting the Contractor to sanctions, including but not limited to monetary penalties, withholding of payments, contract suspension or termination.

Contractor Authorizing Signature

Date

Print Name

Title

Email

Telephone

The Contractor is required to sign this Certification only once and may provide a copy of the signed Certification for any contract executed with an Executive Branch Department. A copy of this signed Certification must be attached to the "record copy" of all contracts with this Contractor that are filed with the contracting Department.

FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL PROJECT

Wage Rates

In accordance with the provisions of Massachusetts General Laws, Chapter 30, Section 39M and Chapter 149, Sections 26 to 27H, the undersigned certifies under penalties of perjury, that

Name of Company

shall comply with prevailing wage requirements as set forth in M.G.L. Chapter 149, Sections 26 to 27H.

Further, the undersigned acknowledges that he / she has read and understands the additional information pertaining to these requirements provided below, including the prevailing wage sheets, payroll certification statements, and payroll certification forms.

Authorized Signature

Print Name & Title

Company

Date

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FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL PROJECT

Wage Rates Statement of Compliance

Date: _____

I, _____, do hereby state:
(Name of signatory) (Title)

that I pay or supervise the payment of the persons employed by:

_____pertaining to
(Contractor or Subcontractor)

(Project Location and Contract Number)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty-nine of the General Laws.

Authorized Signature

Print Name & Title

Company

Date

The above-referenced copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to MassDOT's Rail and Transit Division for such inspection.

Massachusetts General Laws c. 149, §27, requires annual updates to prevailing wage schedules for all public construction contracts lasting longer than one year. MassDOT will request the required updates and furnish them to Contractor. Contractor is required to pay no less than the wage rates indicated on the annual updated wage schedules.

MassDOT will request the updates no later than two (2) weeks before the anniversary of the Notice to Proceed date of the contract to allow for adequate processing by the Division of Occupational Safety (DOS). The effective date for the new rates will be the anniversary date of the contract (i.e. the notice to proceed date), regardless of the date of issuance on the schedule from DOS.

All Bidders and Contractors are cautioned that the aforementioned laws require that employers pay to covered employees no less than the applicable minimum wages. In addition, the same laws require that the applicable prevailing wages become incorporated as part of this contract. The prevailing minimum wage law establishes serious civil and criminal penalties for violations, including imprisonment and exclusion from future public contracts. Bidders and contractors are cautioned to carefully read the relevant sections of the Massachusetts General Laws (most recently amended August, 2008).

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Additional Required Documents to be Submitted by Apparent Successful Bidder

The Apparent Successful Bidder will be required to provide and/or complete and submit additional documents after notification of successful bid in order to execute the Contract. The additional required documents include, but are not limited to, the following:

A. Bonds

1. Completed Performance Bond in the amount of 100% of the Contract Price
 - Form is attached*
2. Completed Payment Bond in the amount of 100% of the Contract Price
 - Form is attached*

*The Performance Bond and the Payment Bond shall be in a form satisfactory to the Department, furnished by a surety company incorporated pursuant to Chapter 175, Section 105 of the General Laws or authorized to do business in the Commonwealth under Chapter 175, Section 106 of the General Laws and satisfactory to the awarding authority. The name of the agency or agent writing these bonds shall be identified with or on the bond.

B. Forms and Certifications

1. Certificate of State Tax Compliance
 - Form is attached
2. Insurance / Surety Powers of Attorney
3. Insurer's Affidavit for Worker's Compensation
4. Certification of Construction Equipment Standard Compliance
5. Diesel Construction Equipment Data Sheet
 - List and certify all large non-road diesel construction equipment (greater than 50 HP) used on this Contract

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FY 2025 CAPITAL IMPROVEMENT PROGRAM EAST DEERFIELD YARD INTERMODAL PROJECT

PERFORMANCE BOND

Know all men by these presents, that _____, a corporation duly organized under the laws of the Commonwealth of Massachusetts and having a usual place of business in _____, _____ as principal, and _____ as surety, are held and firmly bound upon the Massachusetts Department of Transportation in the sum of _____ (\$ _____) lawful money of the United States of America, to be paid to the Massachusetts Department of Transportation, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly be these presents.

Whereas, the said principal has made contract with the Massachusetts Department of Transportation, bearing date of _____, 2024, for the construction of Contract Number **128373 – East Deerfield Yard Intermodal Project**.

Now the condition of this obligation is such that if the principal shall well and truly keep and perform all the undertakings, covenants, agreements, terms, and conditions of the said contract on its part to be kept and performed during the original term of said contract and any extensions thereof that may be granted by the Massachusetts Department of Transportation, with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void; otherwise it shall remain in full force and virtue.

In the event that the contract is abandoned by the Contractor, or is terminated by the Massachusetts Department of Transportation, under the provisions of Sec. 8.12 of the Standard Specifications for Highways and Bridges, said surety hereby further agrees that, if required in writing by the Massachusetts Department of Transportation, said surety shall take such action as is necessary to complete said contract.

In witness whereof we hereunto set our hands and seals this _____ day of _____, 2024

Principal

Corporate Seal

Surety
Corporate Seal

FY 2025 CAPITAL IMPROVEMENT PROGRAM EAST DEERFIELD YARD INTERMODAL PROJECT

PAYMENT BOND

Know all men by these presents, that _____, a corporation duly organized under the laws of the Commonwealth of Massachusetts and having a usual place of business in _____, and

as surety, are held and firmly bound unto the Massachusetts Department of Transportation in the sum of _____ (\$ _____) lawful money of the United States of America, to be paid to the Massachusetts Department of Transportation, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executor administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the said principal has made a contract with the Massachusetts Department of Transportation bearing date of _____, 2024, for the construction of Contract Number **128373 – East Deerfield Yard Intermodal Project**.

Now the condition of this obligation is such that if the principal shall pay for all labor performed or furnished and for all materials used or employed in said contract and in any and all duly authorized modifications, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the surety of such modifications, alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to, the provisions of Massachusetts General Laws, (Ter. Ed.), Chapter 30, Section 39A as amended and Chapter 149, Section 29 as amended, then this obligation shall become null and void; otherwise it shall remain in full force and virtue.

In witness whereof we hereunto set our hands and seals this _____ day of _____, 2024

Principal

BY _____ Corporate Seal

Surety
Corporate Seal

1. Name and Address of Agent or Agency receiving commission on this Performance and Payment Bond.

2. Name and Address of Resident Agent, if any, of Surety, or other Agent appointed by Surety to Whom Notice should be sent (Must be completed by Attorney-in-Fact of Surety).

Surety
Corporate Seal

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FY 2025 CAPITAL IMPROVEMENT PROGRAM
EAST DEERFIELD YARD INTERMODAL PROJECT

Certificate of State Tax Compliance

In accordance with the provisions of Chapter 62C, Section 49A(b) of the Massachusetts

General Laws, I, _____
[Name & Title]

authorized signatory for _____
[Name of Company]

which has a principal place of business at _____

do hereby certify under the pains and penalties of perjury that _____
[Name of Company]

has complied with all laws of the commonwealth relating to taxes, reporting of employees and
contractors, and withholding and remitting of child support..

Authorized Signature

Print Name and Title

Company

Date

*** END OF DOCUMENT***

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DOCUMENT B00853

SCHEDULE OF PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES (DBEs)

PRIME BIDDER: _____

DATE OF BID OPENING: December 30, 2024PROJECT NO.: 613915FEDERAL AID PROJECT NO. 69A36523420000RLDMAPROJECT LOCATION: East Deerfield, MA

Name, Address, and Phone Number(s) of DBE	Name of Activity	(a) [†] DBE Contractor Activity Amount <i>Construction Work</i>	(b) DBE Other Business Amount <i>Services, Supplies, Material</i>	(c) Total amount eligible for credit under rules in Section 6 of Document 00719 - DBE Special Provisions
Total Bid Amount	TOTALS:	\$	\$	\$
\$ _____	DBE Percentage of Total Bid:	%	%	%

[†] Column (a) must be at least one-half of the DBE participation goal. Attach additional sheets as necessary.

Is MassDOT Document B00855 (Joint Check Approval) being submitted for any of the above? ☐ Yes ☐ No

☐ Not Known at This Time

Will any of the contractors listed above be using a third party (i.e. manufacturer) to deliver materials or perform any portion of work by a third party? ☐ Yes ☐ No

CERTIFICATION: I HEREBY DECLARE, TO THE BEST OF MY KNOWLEDGE, THAT I HAVE READ THE SPECIAL PROVISIONS FOR PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES - DOCUMENT 00719. BOTH THIS SCHEDULE AND THE RELEVANT AND ACCOMPANYING LETTER(S) OF INTENT ARE IN FULL COMPLIANCE WITH THE PROVISIONS OF, AND IN ACCORDANCE WITH, TITLE 49 CODE OF FEDERAL REGULATIONS, PART 26 (49 CFR Part 26).

SIGNATURE: _____ DATE _____

NAME AND TITLE (*PRINT*): _____

EMAIL ADDRESS: _____ TEL NO.: _____

*** END OF DOCUMENT ***

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DOCUMENT B00854

DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION LETTER OF INTENT
(To be completed by the DBE – Page 1 of 2)

TO: _____ (Prime Bidder)

FROM: _____ (DBE Firm)

RE: PROJECT NO.: 613915 FEDERAL AID PROJECT NO.: 69A36523420000RLDMAPROJECT LOCATION: East Deerfield, MADATE OF BID OPENING: December 30, 2024

I, _____, authorized signatory of the above-referenced DBE firm
hereby declare:

Print Name

1. My company is currently certified as a Disadvantaged Business Enterprise (DBE) by the Massachusetts Supplier Diversity Office (“SDO”), formerly known as the State Office of Minority and Women Business Assistance (SOMWBA), as a: (check all applicable, see Section 1 of the Special Provisions For Participation By Disadvantaged Business Enterprises, MassDOT Document 00719 additional guidance is available at Title 49, Code of Federal Regulations, Part 26.55 (49 CFR Part 26.55)):
☐ CONTRACTOR ☐ REGULAR DEALER ☐ BROKER
☐ MANUFACTURER ☐ TRUCKING OPERATIONS ☐ PROFESSIONAL SERVICES
2. My firm has the ability to manage, supervise and perform the activity described on page 2 of this Letter of Intent. If you are awarded the contract, my company intends to enter into a contract with your firm to perform the items of work or other activity described on the following sheet for the prices indicated.
3. There have been no changes affecting the ownership, control or independence of my company since my last certification review on _____, 20____. If any such change is planned or occurs prior to my company's completion of this proposed work, I will give prior written notification to your firm and to the Massachusetts Department of Transportation (“MassDOT”) Office of Civil Rights and SDO.
4. I have read the MassDOT proposal for the Project which may be entitled “Project Contract Documents and Special Provisions” or the draft “Contract” which includes MassDOT Document 00719, and acknowledge that my company will comply with that document and the requirements of 49 CFR Part 26.
5. For the purpose of obtaining subcontractor approval from MassDOT, my firm will provide to you:
A. The following construction work:
 - (i) a resume, stating the qualifications and experience, of the superintendent or foreperson who will supervise on site-work;
 - (ii) a list of equipment owned or leased by my firm for use on this project; and
 - (iii) a list of all projects (public or private) upon which my firm is currently performing, is committed to perform, or intends to make a commitment to perform. I shall also include, for each project: the name and telephone number of a contact person for the contracting

authority, person, or organization; the dollar value of the work; a description of the work; and my firm's work schedule for the project.

B. ***The following services, materials or supplies:***

- (i) a written agreement and invoices for the materials or supplies, and any other documents evidencing the terms of providing such items;
- (ii) information concerning brokers fees and commissions for providing services or materials; and
- (iii) a statement concerning whether my firm intends or will be required to use a joint check arrangement; and any other documents that may be required by MassDOT.

DBE Company Authorized Signature

Date

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DISADVANTAGED BUSINESS ENTERPRISES (DBE) PARTICIPATION
LETTER OF INTENT

(To be completed by the DBE – Page 2 of 2)

DATE OF BID OPENING: December 30, 2024PROJECT NUMBER: 613915FEDERAL AID PROJECT NUMBER: 69A36523420000RLDMAPROJECT LOCATION: East Deerfield, MA

PRIME BIDDER: _____

DBE COMPANY NAME: _____

<u>Item number</u> if applicable	<u>NAICS</u> <u>Code</u>	<u>Description of Activity</u> with notations such as Services, or Brokerage, Installation Only, Material Only, or Complete	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
TOTAL AMOUNT:					

Please give full explanations, attach additional sheets if necessary.

I HEREBY VERIFY THAT _____ WILL SOLELY
(DBE company name)
PERFORM THE WORK, OR PROVIDE THE SERVICES OR MATERIALS, AS DESCRIBED
ABOVE.

DBE AUTHORIZED SIGNATURE: _____

NAME AND TITLE (PRINT): _____

TELEPHONE NUMBER: _____ FAX NUMBER: _____

EMAIL ADDRESS: _____

Rev'd 9/20/19

*** END OF DOCUMENT ***

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DOCUMENT B00855

DBE JOINT CHECK ARRANGEMENT APPROVAL FORM

*(to be submitted by Prime Contractor)*Contract No: 128373 Project No. 613915 Federal Aid No.: 69A36523420000RLDMALocation: East Deerfield, MA Bid Opening Date: December 30, 2024Project Description: Repair/Rehabilitation of East Deerfield Intermodal Yard

We have received the attached request for the use of a joint check arrangement from _____, a DBE on the above- referenced Contract and _____, a Material Supplier/Vendor for the subject Contract. The DBE has complied with the requirements of 49 CFR Part 26.55(c)(1). In particular, the DBE has:

- a written agreement with the material supplier/vendor;
- applied for credit with the subject material supplier and has supplied the vendor's response;
- shown that it will place all orders to the subject material supplier/vendor;
- made and retains all decision-making responsibilities concerning the materials; and
- provided a Joint Check Agreement that is acceptable to MassDOT;

As the Contractor for the Project, we agree to issue joint checks (made payable to the Material Supplier/Vendor and the DBE) for payment of sums due pursuant to invoices from the Supplier/Vendor and DBE.

Contractor:

_____ Company Name	_____ Signature Duly Authorized
	_____ Printed Name
_____ Date	_____ Title

SubContractor:

_____ Company Name	_____ Signature – Duly Authorized
	_____ Printed Name
_____ Date	_____ Title

*** END OF DOCUMENT ***

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DOCUMENT B00856

JOINT VENTURE AFFIDAVIT

(All Firms)

- All Information Requested By This Schedule Must Be Answered. Additional Sheets May Be Attached.
- If, there is any change in the information submitted, the Joint Venture parties must inform MassDOT Pre-Qualifications Office (and, if one of the companies is a DBE, the Director of Contract Compliance, Office of Civil Rights) *prior* to such change, in writing, either directly or through the Prime Contractor if the Joint Venture is a subcontractor.
- If the Joint Venture Entity will be the bidder on a prime Contract, it must bid and submit all required documents (insurance, worker's compensation, bonds, etc.) in the name of the Joint Venture Entity.

I. Name of Joint Venture: _____

Type of Entity if applicable (Corp., LLC): _____ Filing State _____

Address of joint venture: _____

Phone No(s) for JV Entity: _____ E-mail: _____

Contact Person(s) _____

Tax ID/EIN of Joint Venture: _____ Vendor Code: _____

II. Identify each firm or party to the Joint Venture:

Name of Firm: _____

Address: _____

Phone : _____ E-mail: _____

Contact person(s) _____

Name of Firm: _____

Address: _____

Phone: _____ E-mail: _____

Contact Person(s) _____

III. Describe the role(s) of the each party to the Joint Venture:_____

- IV. Attach a copy of the Joint Venture Agreement.** The proposed Joint Venture Agreement should include specific details including, but not limited to: (1) the contributions of capital and equipment; (2) work items to be performed by each company's forces, (3) work items to be performed under the supervision of any DBE Venturer; (4) the commitment of management, supervisory and operative personnel employed by the DBE to be dedicated to the performance of the Project; and (5) warranty, guaranty, and indemnification clauses.

- V. Attach any applicable Corporate or LLC Votes, Authorizations, etc.**

VI. Ownership of the Joint Venture:

A. What is the percentage(s) of each company's ownership in the Joint Venture?

ownership percentage(s): _____

ownership percentage(s): _____

B. Specify percentages for each of the following (provide narrative descriptions and other detail as applicable):

1. Sharing of profit and loss: _____

2. Capital contributions:

(a) Dollar amounts of initial contribution: _____

(b) Dollar amounts of anticipated on-going contributions: _____

(c) Contributions of equipment (specify types, quality and quantities of equipment to be provided by each firm): _____

3. Other applicable ownership interests, including ownership options or other agreements, which restrict or limit ownership and/or control:

4. Provide copies of all other written agreements between firms concerning bidding and operation of this Project or projects or contracts.

5. Identify all current contracts and contracts completed during the past two (2) years by either of the Joint Venture partners to this Joint Venture:

VII. Control of and Participation in the Joint Venture. Identify by name and firm those individuals who are, or will be, responsible for and have the authority to engage in the following management functions and policy decisions. (Indicate any limitations to their authority such as dollar limits and co-signatory requirements.):

A. Joint Venture check signing:

B. Authority to enter Contracts on behalf of the Joint Venture:

C. Signing, co-signing and/or collateralizing loans:

D. Acquisition of lines of credit:

E. Acquisition and indemnification of payment and performance bonds:

F. Negotiating and signing labor agreements:

G. Management of contract performance. (*Identify by name and firm only*):

1. Supervision of field operations: _____
2. Major purchases: _____
3. Estimating: _____
4. Engineering: _____

VIII. Financial Controls of Joint Venture:

A. Which firm and/or individual will be responsible for keeping the books of account?

B. Identify the "Managing Partner," if any, and describe the means and measure of their compensation:

C. What authority does each firm have to commit or obligate the other to insurance and bonding companies, financing institutions, suppliers, subcontractors, and/or other parties participating in the performance of this Contract or the work of this Project?

IX. Personnel of Joint Venture: State the approximate number of personnel (by trade) needed to perform the Joint Venture's work under this Contract. Indicate whether they will be employees of the majority firm, DBE firm, or the Joint Venture.

	Firm 1 (number)	Firm 2 (number)	Joint Venture (number)
Trade			
Professional			
Administrative/Clerical			

Unskilled Labor			

Will any personnel proposed for this Project be employees of the Joint Venture?:

If so, who: _____

A. Are any proposed Joint Venture employees currently employed by either firm?

Employed by Firm 1: _____ Employed by firm 2 _____

B. Identify by name and firm the individual who will be responsible for Joint Venture hiring: _____

X. Additional Information. Please state any material facts and additional information pertinent to the control and structure of this Joint Venture.

XI. AFFIDAVIT OF JOINT VENTURE PARTIES. The undersigned affirm that the foregoing statements and attached documents are correct and include all material information necessary to identify and explain the terms and operations of our Joint Venture and the intended participation of each firm in the undertaking. Further, the undersigned covenant and agree to provide to MassDOT current, complete and accurate information regarding actual Joint Venture work, payments, and any proposed changes to any provisions of the Joint Venture, or the nature, character of each party to the Joint Venture. We understand that any material misrepresentation will be grounds for terminating any Contract awarded and for initiating action under Federal or State laws concerning false statements.

Firm 1

Firm 2

Signature
Duly Authorized

Signature
Duly Authorized

Printed Name and Title

Printed Name and Title

Date

Date

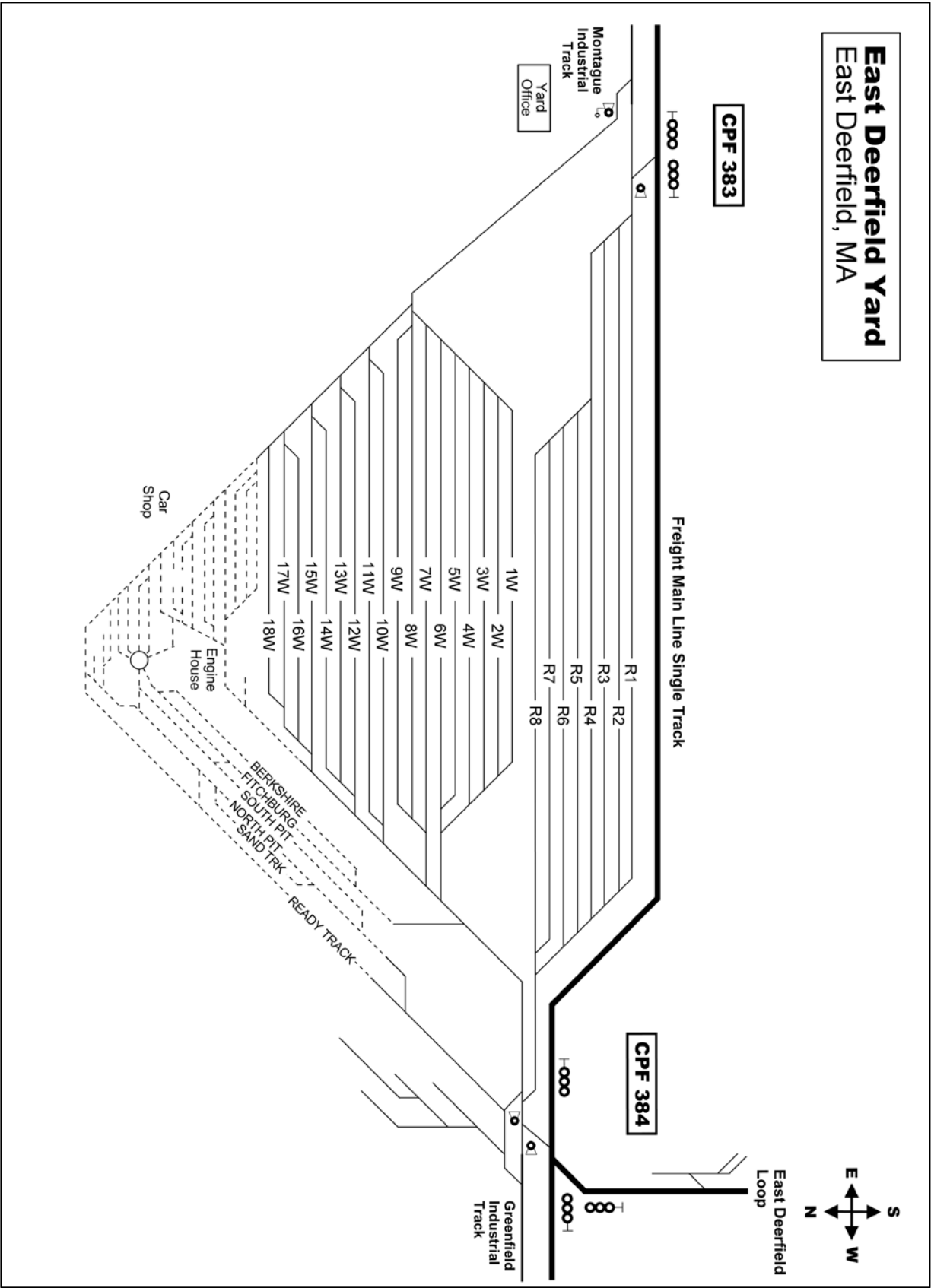
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APPENDIX A

EAST DEERFIELD YARD TRACK SCHEMATIC

EAST DEERFIELD YARD



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APPENDIX B

ROADWAY WORKER PROTECTION MANUAL AND ON-TRACK SAFETY PROGRAM - PAR



PAN AM RAILWAYS

ROADWAY WORKER ON-TRACK PROTECTION MANUAL

**SPRINGFIELD TERMINAL RAILWAY COMPANY
PAN AM SOUTHERN, LLC
BOSTON & MAINE CORPORATION
MAINE CENTRAL RAILROAD COMPANY**

WHAT IS A ROADWAY WORKER?

A roadway worker is any employee of a railroad, or of a contractor to a railroad, whose duties include inspection, construction, maintenance or repair of railroad track, bridges, roadway, signal and communication systems, electric traction systems, roadway facilities or roadway maintenance machinery on or near track with the potential of fouling a track, and flagmen and watchmen/lookouts.

WHAT IS AN EMPLOYEE RESPONSIBLE FOR ON-TRACK PROTECTION?

The employee responsible for on-track protection is the roadway worker designated by Pan Am Railways to provide on-track safety for all members of the group.

WHAT IS A LONE WORKER?

A lone worker is an individual roadway worker who is not being afforded on-track safety by another roadway worker, who is not a member of a roadway work group, and who is not engaged in a common task with another roadway worker.

WHAT IS FOULING A TRACK?

Fouling a track means the placement of an individual or an item of equipment in such proximity to a track that the individual or equipment could be struck by a moving train or on-track equipment, or in any case is within 4 feet of the field side of the near running rail.

WHAT IS ON-TRACK PROTECTION?

On-track protection is a state of freedom from the danger of being struck by a moving train or other railroad equipment, provided by operating and safety rules that govern track occupancy by personnel, trains and on-track equipment.

WHAT INFORMATION DOES THIS MANUAL CONTAIN?

This manual contains rules and operating procedures governing track occupancy and protection.

HOW SHOULD THIS MANUAL BE USED?

A roadway worker providing on-track protection for himself or other roadway workers must have this manual with him at all times.

ON-TRACK PROTECTION FLOW CHART

STEP 1

KNOW YOUR RESPONSIBILITIES

- 1A. All roadway workers
- 1B. Employee responsible for on-track protection
- 1C. Lone worker

STEP 2

DETERMINE THE TYPE OF TRACK

- 2A. Controlled track
- 2B. Non-controlled track
- 2C. Interlocking limits
- 2D. Remotely controlled hump yard facility

STEP 3

DETERMINE WHO NEEDS PROTECTION

- 3A. Roadway work group
- 3B. Lone worker

STEP 4

DETERMINE THE PROTECTION AVAILABLE

- 4A. Exclusive use of track
- 4B. Foul time
- 4C. Inaccessible track
- 4D. Individual train detection
- 4E. Watchmen
- 4F. Train Coordination
- 4G. Incidental Crossing of Track (s)

STEP 5

ESTABLISH THE PROTECTION

- 5A. Exclusive use of track
- 5B. Foul time
- 5C. Inaccessible track
- 5D. Individual train detection
- 5E. Watchmen
- 5F. Train Coordination
- 5G. Incidental Crossing of Track (s)
- 5H. Adjacent Track Protection (if applicable)

STEP 6

PERFORM THE WORK AND CLEAR THE TRACK

- 6A. Operating roadway maintenance machines
- 6B. Clear the tracks

STEP 1

KNOW YOUR RESPONSIBILITIES

Step 1 in establishing on-track protection is to know your responsibilities.

This section gives responsibilities for the following types of roadway employees:

- 1) All roadway workers
- 2) Employee responsible for on-track protection
- 3) Lone worker

1A. RESPONSIBILITIES OF ALL "ROADWAY WORKERS"

- 1A1. Each roadway worker must fully understand and acknowledge understanding of a job briefing that includes information on the means by which on-track safety is to be provided, and instruction on the on-track safety procedures to be followed before fouling a track. Four feet from the rail of a track will be considered as fouling that track.
- 1A2. Each roadway worker is responsible for following the Pan Am Railways on-track safety rules.
- 1A3. A roadway worker shall not foul a track except when necessary for the performance of duty.
- 1A4. Each roadway worker is responsible to ascertain that on-track safety is being provided before fouling a track.
- 1A5. Each roadway worker must know who is responsible for providing the on-track protection.
- 1A6. Roadway workers may not work near roadway machines unless the roadway worker has been informed by the roadway machine operator of the safety procedures applicable to persons working near the roadway machines and has acknowledged full understanding.
- 1A7. A roadway worker has the absolute right to challenge, in good faith, whether an on-track safety procedure to be applied at the job location does not comply with the Pan Am Railways on-track safety rules, and to remain clear of the track until the challenge is resolved. The following is the procedure to be used if a roadway worker determines that it is necessary to make a good faith challenge:
 1. The roadway worker shall inform the "employee responsible for on-track protection" that the on-track safety protection does not comply. Everyone remains clear of the track.
 2. The "employee responsible for on-track protection" further explains the on-track protection that is being provided. If the challenge is resolved it is okay to work. If there is still a challenge, remain clear of the track and go to the next section (c).
 3. The roadway worker shall fill out an "**ON-TRACK PROTECTION GOOD FAITH CHALLENGE FORM**" and review this with a supervisor and the "employee responsible for on-track protection". If the challenge is resolved it is okay to work. The Challenge Form will be forwarded to the Engineering Department Manager of Personnel. If there is still a challenge, remain clear of the track and go to section (d).
 4. The "**ON-TRACK GOOD FAITH CHALLENGE FORM**" will be reviewed by an Engineer of Track, Engineer of Signals, Engineer of Bridges and Buildings, or the Chief

Train Dispatcher. If the challenge is resolved it is okay to work. The Challenge Form will be forwarded to the Engineering Department Manager of Personnel. If there is still a question, the Engineer will explain to the roadway worker why the challenge is invalid and inform him that it will be okay to work.

1B. RESPONSIBILITIES OF "EMPLOYEE RESPONSIBLE FOR ON-TRACK PROTECTION" (EROP)

- 1B1. The Track Foreman, the Bridge and Building Foreman, or the qualified leading member of a Signal Crew is generally designated by Pan Am Railways as the "Employee Responsible for On-track Protection" (EROP) for members of his/her respective work group. If there is more than one work group working together there will be one EROP, generally designated as the senior Foreman. The EROP may also be specifically designated for a particular work situation.
- 1B2. Each EROP shall communicate at the beginning of each duty period with a supervisor or another designated employee, normally his Supervisor or the Train Dispatcher, to receive a job briefing and to advise of his or her planned itinerary and the procedures that he or she plans to use for on-track safety.
- 1B3. The EROP will be qualified under the Pan Am Railway's operating rules and physical characteristics of the territory involved.
- 1B4. Before any member of a roadway group fouls a track, the EROP shall conduct a job briefing which informs each roadway worker of the on-track safety procedures to be used and followed during the performance of the work and ascertain that those procedures are in place.
- 1B5. The EROP will again conduct a job briefing to notify each roadway worker at anytime the on-track safety procedures change. This notice will be given prior to the time the change is effective.
- 1B6. If a roadway worker challenges in good faith whether the on-track safety procedures to be applied at the job location does not comply with the on-track safety protection, the EROP will follow the procedure in 1A7.

1C. RESPONSIBILITIES OF "LONE WORKER"

- 1C1. Each lone worker shall communicate at the beginning of each duty period with a supervisor or another designated employee, normally his Supervisor or the Train Operations Manager, to receive a job briefing and to advise of his or her planned itinerary and the procedures that he or she plans to use for on-track safety.
- 1C2. When communication channels are disabled, the job briefing shall be conducted as soon as possible after the beginning of the work period when communications are restored.
- 1C3. Each Lone Worker will be qualified under the Pan Am Railway's operating rules and physical characteristics of the territory involved

STEP 2

DETERMINE THE TYPE OF TRACK

Step 2 in establishing on-track protection is to determine the type of track to be protected.

Determine whether the track is:

- 1) Controlled Track
- 2) Non-controlled track
- 3) Interlocking limits
- 4) Remotely controlled hump yard facilities

2A. CONTROLLED TRACK

2A1. Controlled track is track upon which all movements must be authorized by a Train Dispatcher.

2B. NON-CONTROLLED TRACK

2B1. Non-controlled track is track upon which trains are permitted by the rules or special instructions to move without receiving authorization from a Train Dispatcher.

2C. INTERLOCKING LIMITS

2C1. Interlocking limits are the tracks between the opposing home signals of an interlocking.

2D. REMOTELY CONTROLLED HUMP YARD FACILITY

2D1. There are no remotely controlled hump yard facilities on Pan Am Railways.

STEP 3

DETERMINE WHO NEEDS PROTECTION

Step 3 in establishing on-track protection is to determine who needs to be protected.

Determine whether the employee(s) to be protected are:

- 1) Roadway work group
- 2) Lone Worker

3A. ROADWAY WORK GROUP

3A1. A roadway work group is two or more employees.

3B. LONE WORKER

3B1. A lone worker is an individual employee who is not being afforded on-track protection by another employee.

STEP 4

DETERMINE THE PROTECTION AVAILABLE

Step 4 in establishing on-track protection is to determine what types of protection are available based on the type of track and employees that need to be protected.

Determine the type of protection available from the following:

- 1) Exclusive use of track
- 2) Foul time
- 3) Inaccessible track
- 4) Individual train detection
- 5) Watchman
- 6) Train Coordination
- 7) Incidental Crossing of Track (s)

4A. EXCLUSIVE USE OF TRACK

4A1. Exclusive use of track establishes working limits on controlled track occupancy whereby the Train Dispatcher withholds or restricts authority to move into the working limits.

4B. FOUL TIME

4B1. Foul time establishes working limits on controlled track through exclusive track occupancy whereby the Train Dispatcher gives an employee verbal permission to foul a specific segment of controlled track during a specific time period and the Train Dispatcher applies blocking devices to protect the track being fouled.

4B2. Foul time remains in effect until the employee to whom the foul time was issued reports clear of the track.

4B3. Foul time cannot be used if the work involves on-track equipment or if the work will make the track structure unsafe for normal speed.

4C. INACCESSIBLE TRACK

4C1. Inaccessible track establishes working limits on non-controlled track by using switches, derails, and/or flagmen to prevent access to the working limits.

4D. INDIVIDUAL TRAIN DETECTION (ITD)

4D1. Individual train detection may be used under strictly defined circumstances by trained and qualified lone workers to provide on-track protection on certain tracks outside working limits.

4E. WATCHMEN

4E1. Watchmen establish on-track protection by warning employees of approaching trains so the employees can clear the tracks before the trains reach the work site.

4F. TRAIN COORDINATION

- 4F1. Lone workers and Employee's Responsible for On-Track Protection may use Train Coordination to establish Working Limits on a segment of track by utilizing the Train's Exclusive Authority to operate on the specific segment of track. The EROP then must exercise control over all train movements.

4G. INCIDENTAL CROSSING of TRACK (S)

- 4G1. Roadway Workers may cross tracks under strictly defined circumstances when the sole purpose is to cross from one side to the other. No work or inspection may be performed during the crossing.

STEP 5

ESTABLISH THE PROTECTION

Step 5 establishing on-track protection is to establish the specific type of protection. (See most current NORAC edition for complete NORAC Rule.)

Determine the type of protection required:

- 1) Exclusive use of track
- 2) Foul time
- 3) Inaccessible track
- 4) Individual train detection
- 5) Watchman
- 6) Train Coordination
- 7) Incidental Crossing of Track (s)
- 8) Adjacent Track Protection (if applicable)

5A. EXCLUSIVE USE OF TRACK

5A1. The following rules give procedures for establishing exclusive use of track:

NORAC RULE 132; Protection for the Safe Passage of Trains

NORAC RULE 133; Removing a Track from Service

NORAC RULE 241; Passing a stop signal

NORAC RULE 803; Placing or Operating Track Cars on Tracks

NORAC RULE 804; Additions to Form D Line 2

NORAC RULE 805; Track Car Following Other Movements

NORAC RULE 806; Train Following Track Car

5B. FOUL TIME

5B1. The following rules give procedures for establishing foul time:

NORAC RULE 132; Protection for the Safe Passage of Trains

NORAC RULE 140; Foul Time

5C. INACCESSIBLE TRACK

5C1. The following rule gives procedures for establishing inaccessible track:

NORAC RULE 141; Inaccessible Track

5D. INDIVIDUAL TRAIN DETECTION (ITD)

5D1. A lone worker who fouls a track while performing routine inspection or minor correction may watch for trains himself only if all of the following conditions are met:

- 1) The lone worker is trained and qualified to use ITD.
- 2) The lone worker is performing routine inspection or minor correction work.
- 3) The track is outside the limits of a manual interlocking, a controlled point, or a remotely controlled hump yard facility.
- 4) The lone worker is able to visually detect the approach of a train moving at the maximum speed authorized on that track, and move to a previously determined place of safety, not less than 15 seconds before the train would arrive at the location of the lone worker.
- 5) The previously predetermined place of safety to be occupied by a lone worker upon the approach of a train may not be on a track, unless working limits are established on that track.
- 6) No power-operated tools or roadway maintenance machines are in use within the hearing range of the lone worker.
- 7) The ability of the lone worker to hear and see approaching trains and other on-track equipment is not impaired by background noise, lights, precipitation, fog, passing trains, or any other physical conditions.
- 8) A lone worker using ITD for on-track safety while fouling a track may not occupy a position or engage in any activity that would interfere with that worker's ability to maintain a vigilant lookout for, and detect the approach of, a train moving in either direction.
- 9) The lone worker must conduct a job briefing (communication) with his Supervisor or other designated employee, such as the Dispatcher, at the beginning of his tour of duty, which must include:
 - The lone worker's planned itinerary, and
 - The on-track protection to be used if the lone worker is unable to communicate with the designated employee due to a communications failure, the lone worker may begin the work and conduct the job briefing as soon as communications are restored
- 10) The lone worker must have completed a written Statement of On-Track Safety as depicted on the following page. Only one statement can be in effect at a time. Only one controlled track and a maximum of three adjacent non-controlled yard tracks may be shown on the form.

ITD STATEMENT OF ON-TRACK SAFETY

Name _____ Date _____ Time _____

Line _____ Track No. _____ From M.P. _____ To M.P. _____

Yard _____ Track No(s). _____

Instruction:

This form must be used by a Lone Worker when using ITD. Use your timetable to determine the maximum speed authorized in the area you will be fouling. Place an **X** in the box adjacent to this maximum authorized speed. Determine that you have the required sight distance to clear the track 15 seconds prior to the arrival of the train. You must produce this form when requested by the FRA Representative or Pan Am Railways Supervisor.

Maximum Required Authorized Sight Speed to Distance MPH In Feet	Maximum Required Authorized Sight Speed to Distance MPH In Feet	Maximum Required Authorized Sight Speed to Distance MPH In Feet
5 110	45 990	85 1870
10 220	50 1100	90 1880
15 330	55 1210	95 2090
20 440	60 1320	100 2200
25 550	65 1430	105 2310
30 660	70 1640	110 2420
35 770	75 1660	
40 880	80 1760	

The Lone Worker has the absolute right to use On-Track Protection procedures other than ITD if deemed necessary and to occupy a place of safety until another form of protection can be established.

5E. WATCHMEN

- 5E1. The Watchman will be either the employee responsible for on-track protection or an employee assigned by the employee responsible for on-track protection who he is confident can identify on coming trains or on-track equipment and subsequently provide warning to roadway workers.
- 5E2. The watchman's sole duty is to look out for approaching trains or on-track equipment and provide at least fifteen seconds advanced warning to employees before arrival of trains or on-track equipment.
- 5E3. The watchman will warn the employees of approaching trains or on-track equipment by voice, whistle, air horn or other effective means necessary for the given conditions.
- 5E4. The chart in the Lone Worker section can be used to provide the watchman with the sight distance required to clear the track 15 seconds prior to the arrival of the train.

5F. TRAIN COORDINATION

- 5F1. A lone worker or an employee responsible for on-track protection for a group of Roadway Workers may establish working limits by notifying the crew member in charge of a train that they will now be working under Train Coordination and must not move without his permission. The train or engine must be stopped during notification that the train coordination protection will be used. This method of protection may be used when Roadway Workers are working with an individual train during emergencies, handling materials with a work train or repairing track at a derailment.
- 5F2. Roadway work groups can work with a train on non-controlled track only when:
 - 1) The track has been made **inaccessible** to all movements except the single train, too which the Roadway Worker is assigned, and
 - 2) All other trains, which have access to the same tracks where Train Coordination is being used will cease all movements or will be unoccupied and secured to prevent their movement.

5G. INCIDENTAL CROSSING of TRACK (s)

- 5G1. A Roadway Worker may cross track (s) when the sole purpose is to get from one side to the other side.
- 5G2. No work or inspection is allowed during the crossing.
- 5G3. Before crossing, use the ITD STATEMENT of ON-TRACK SAFETY to determine the required sight distances for the speed of the track (s).
- 5G4. Look both ways prior to crossing and take the shortest route. If you must cross more than one track, stop and look both ways before crossing each track.
- 5G5. Do not cross tracks closer than 15 feet from standing equipment.

5H. ADJACENT TRACK PROTECTION

Adjacent Controlled track – means a controlled track whose track centers is spaced 19 feet or less from the track center of the occupied track.

Regulation applies to roadway work groups doing large scale maintenance and construction with equipment that has the potential to foul the track. This does not apply to minor correction work or hi-rail vehicles used for inspections.

If you are working in multiple controlled track territory with equipment that has potential to foul an adjacent track; and the track centers are 19 feet or less; and the speed is greater than 25mph freight and 40mph passenger; one the following must apply;

- 1) Have exclusive authority over the adjacent track that has speed greater than 25/40 (ie. Line 4 or Foul time.
or
- 2) Put a temporary speed restriction on the adjacent track to drop the speed to 25mph or less.
or
- 3) Use a watchmen at both end of the working limits to warn work crew of approaching trains
or
- 4) Use an “inter-track barrier” which means, “a continuous barrier of a permanent or semi-permanent nature that spans the entire work area, that is at least 4 feet in height, and that is of sufficient strength to prevent a roadway worker from fouling the adjacent track”

Upon the approach of a train on an adjacent track refer back to Section 6B in current Roadway Worker On-Track Protection Manual.

Step 6

PERFORM THE WORK AND CLEAR THE TRACK

Step 6 in establishing on-track protection is performing the work with the appropriate protection and clearing the track when a train or equipment is approaching.

This section gives rules for the following duties:

- 1) Operating roadway maintenance machines
- 2) Clearing tracks

6A. OPERATING ROADWAY MAINTENANCE MACHINES

6A1. The following is required by roadway workers who operate self propelled roadway maintenance machines:

- 1) The roadway worker must be qualified or qualifying under the supervision of a qualified employee to operate the machine. A list of Equipment Operators is maintained by the Engineering Department Personnel Manager of those employees qualified to operate machinery.
- 2) Roadway workers must have access to the Operator's Manual and refer to it as necessary to determine safe operating procedures. If possible, it will kept with the machine.
- 3) Roadway workers must communicate with all employees who will be working near the equipment regarding:
 - a) Normal equipment operating procedures
 - b) Location of employees working around the equipment
 - c) Operator's blind spots
 - d) Signals warning that the equipment will move
- 4) Roadway workers operating equipment must not get closer than 15 feet to employees working on the track in front of or behind their equipment unless the operation requires the employees to be closer and the operator has communicated with the affected employee.
- 5) Operators must keep at least 30 feet between standing or working equipment to avoid collisions. If the operation requires, the 30 feet distance between equipment may be reduced after arrangements have been made with all affected employees.
- 6) Operators must keep at least 200 feet between equipment while traveling. This distance must be increased when warranted by weather conditions, visibility, grade of the track, and stopping capabilities. NORAC RULE 815 limits the maximum travelling speed. The EROP may instruct the operators to bunch the equipment as necessary, particularly around grade crossings and interlockings. If bunching is required the maximum speed must be immediately reduced to 10 mph and further reduced as necessary to avoid collision.

6B. CLEARING TRACKS

6B1. The following rules give procedures for clearing tracks. (See Appendix for the complete NORAC rule.)

- 1) NORAC RULE 808; Clearing a Track Specified on Form D Line 2
- 2) The following safety precautions must be followed when clearing the track on which a train is coming:
 - a) When a roadway worker is notified or becomes aware of the approach of a train, all work must be stopped. All tracks must be cleared by at least 15 seconds before the train arrives.
 - b) The roadway worker working in a group must report to the clearing location designated by the EROP during the job briefing. The roadway worker, working as a lone worker using ITD, must clear the track at the previously determined place of safety.
 - c) The roadway worker may not clear onto another track unless working limits have been established on that track.
 - d) All equipment and vehicles on the right of way must be stopped.
 - e) Tools, material, equipment, or other objects must not be left where the passing train could strike them.
 - f) Stay clear until notified that it is safe to resume work.
- 3) The following safety precautions must be followed when a train approaches on an adjacent track:
 - a) All work must be stopped 15 seconds before the train passes.
 - b) Clear all tracks by 15 feet if possible. When it is not possible to clear all tracks, the safest location may be within the gage of the track where the working limits are in effect.
 - c) Roadway workers operating equipment should apply the parking brakes, dismount the equipment, and clear all tracks by 15 feet if possible. If this cannot be safely completed by 15 seconds prior to the train passing, then the roadway worker should stay on the equipment.

PAN AM RAILWAYS

ROADWAY WORKER / GOOD FAITH CHALLENGE FORM

This section to be filled out by the employee making the GOOD FAITH CHALLENGE

NAME:	_____
IDENTIFICATION NUMBER:	_____
CREW ASSIGNMENT:	_____
CRAFT OR OCCUPATION:	_____
DATE AND TIME:	_____
WORK LOCATION:	_____
City or Town:	_____
State:	_____
Railroad milepost:	_____
TYPE OF TRACK (check one)	
<input type="checkbox"/> Controlled	<input type="checkbox"/> Non-controlled
<input type="checkbox"/> Interlocking Limits	<input type="checkbox"/> Other _____
EMPLOYEE RESPONSIBLE FOR ON-TRACK PROTECTION	
Name:	_____
Title:	_____
Date of occurrence:	_____
STATEMENT (This requires the use of the Pan Am Railways Roadway Worker On Track Protection Manual)	
1. Give a description of the On-Track procedures applied at your work location. And state your specific concerns pertaining to the insufficient On-Track safety being applied at the work-site.	

2. What rule is not be complied with?	

3. Furnish a reason for the GOOD FAITH CHALLENGE.	

OTHER EMPLOYEES WITH INFORMATION CONCERNING THE CIRCUMSTANCES OF THIS CHALLENGE:	
Name:	_____
Name:	_____
SIGNATURE:	DATE: _____

This section to be filled out by the Supervisor reviewing the GOOD FAITH CHALLENGE

DETERMINATION OF SUPERVISOR:	

SUPERVISOR'S SIGNATURE: _____	
DATE: _____	

This section to be filled out by the Staff Engineer reviewing the GOOD FAITH CHALLENGE

DETERMINATION OF STAFF ENGINEER:	

STAFF ENGINEER SIGNATURE: _____	
DATE: _____	

Fax completed GOOD FAITH CHALLENGE form to:

Engineering/Mechanical dept. Personnel Officer 1-978-663-6967 and OPERATIONS at 1-978-663-1096

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APPENDIX A-1 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 132. Protection for the Safe Passage of Trains

Trains must be fully protected against any known condition that may interfere with their safe passage.

a. Protection When Fouling or Working on a Track

If work on or adjacent to a track will create a condition interfering with the safe passage of trains, that work must not be attempted without permission of the employee in charge of the track.

On tracks where ABS, DCS, or Interlocking rules are in effect, the Dispatcher (or) Operator when authorized by the Dispatcher) must assure that protection against trains in both directions has been provided as follows:

1. If the work involves on-track equipment or will disturb the track or catenary structure so that it would be unsafe for Normal Speed, Form D line 4 or Form D line 5 must be issued.
2. If the work will not disturb the track or catenary structure, the Dispatcher may verbally authorize Foul Time in accordance with Rule 140. Form D line 4, Form D line 5, and Foul Time may be issued only to employees who are qualified on the operating rules and the physical characteristics of the territory involved. Form D line 13 may be issued in lieu of Form D line 4 when the information necessary to clearly delineate the limits of the affected track area will not physically fit on line 4. When Form D line 13 is used in this manner, the instructions it contains must be formatted as though issued on Form D line 4.

b. Protection in Unforeseen Conditions

If an event occurs or conditions are found that may interfere with the safe passage of trains and no protection has been provided, employees must immediately attempt to stop trains by radio communication to trains and the Dispatcher. They must provide flag protection in both directions as prescribed by Rule 130, paragraph (b), "Flag Protection Against Trains on Adjacent Tracks." Flag protection must be maintained until the unsafe condition has been corrected, or until employees are assured by the Dispatcher or Operator that other protection has been provided.

APPENDIX A-2 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 133. Removing a Track from Service

Whenever Form D line 4 or line 13 is issued to remove a track from service, the following procedures will apply:

a. Action Required Prior to Issuance

The Dispatcher must not issue the Form D line 4 or line 13 authority until:

1. The affected track is clear of movements that are not part of the work group,

AND

2. Controlled signals leading to the affected track are in Stop position,

AND

3. Blocking devices are applied to the controls of switches and signals leading to the affected track. These signals must not be displayed for movement leading to the out-of-service track, except as provided for in Rule 134, paragraph (a), "Movement in the Direction of the Out-of-Service Track."

b. Addressees

Form D must be issued to both:

1. The employee requesting use of the track,

AND

2. The Operators controlling entrance to the track.

c. Establishing Out-of-Service Limits

Each end of the out-of-service limits must be defined by one of the following physical features:

1. A whole mile post.
2. A station or other physical characteristic location.
3. A track barricade or flagman at a designated location.

d. Operation Within Out-of-Service Limits

The employee named in Form D line 4 or line 13 is in charge of the out-of-service limits. ABS, CSS, DCS, and Interlocking rules do not apply within the out-of-service limits. All movements must operate at Restricted Speed. Interlocked switches, derails, movable point frogs and movable bridges within the out-of-service limits must not be operated without permission of the employee in charge.

EXCEPTION: In territory where non-signaled DCS rules apply in both directions, the employee in charge of the out-of-service limits may authorize trains to operate within the out-of-service limits at Normal Speed not exceeding 30 MPH, when the following conditions have been met:

1. The track to be used must be clear and safe for the speed to be authorized.
2. All affected switches must be secured in normal position.

3. All affected Roadway Workers must be notified.
4. Permission must be given in the following manner: *“Extra 453 may proceed North through my out-of-service limits at Normal Speed (not exceeding 30 MPH) from A to B.”* This permission must be repeated and confirmed before it is acted upon.
5. No following movements may be permitted behind the train given this authority. The train must not reverse direction without permission of the employee in charge. If permission is received, the movement must be made at Restricted Speed.

(Rule 133 Continued)

e. Additional Equipment Entering or Leaving Out-of-Service Limits

1. Additional equipment may enter the out-of-service limits after:
 - (a) The person in charge of the additional equipment has received permission from the employee in charge of the out-of-service limits. The employee in charge of the out-of-service limits must show or read his copy of the Form D line 4 or line 13 to the person in charge of the additional equipment unless the limits are published by Bulletin Order.
 - (b) If movement to the out-of-service limits will involve passing a Stop Signal, the Dispatcher or Operator may then authorize movement in accordance with Rule 241.
2. The employee in charge of the out-of-service limits must make a written record, which includes:
 - (a) The name of the person in charge of the additional equipment, or train identification.
 - (b) Time permission to enter is given.
 - (c) Time determined the additional equipment is clear of limits.

f. Returning the Track to Service

When the track is to be returned to service, the employee in charge of the out-of service track must take two actions:

1. He must notify the Dispatcher or Operator of any restrictions necessary for the safe passage of trains,

AND

2. He must ascertain that all track cars and trains are clear of the track, and notify the Dispatcher or Operator that they are clear.

EXCEPTION: With the Dispatcher's permission, the track may be returned to service while it is still occupied by equipment. Before the track is returned to service, the employee in charge of the track must ensure that the equipment remaining on the track receives proper authority to occupy the track after it is returned to service. If the track is governed by Rule 261, permission must include direction of movement.

APPENDIX A-3 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 140. Foul Time

Foul Time may be issued only by the Dispatcher, or Operator when authorized by the Dispatcher.

a. Action Required Prior to Issuance

Before issuing or authorizing Foul Time, the Dispatcher must determine that no trains or other on-track equipment have been authorized to occupy the track segment to be fouled. In signaled territory, the Dispatcher must ensure that Stop Signals have been displayed and blocking devices applied to controls of switches and signals leading to the affected track. When trains are to be held at a TBS where blocking devices cannot be applied, the Dispatcher must issue Form D line 13 instructing the Operator to hold trains clear of the affected track.

b. Permission to Foul

Permission to foul the track must include the following information:

1. Title and name of employee receiving foul time
2. Track designation
3. Track limits (between/at)
4. Time limits

The receiving employee must repeat this permission and the Dispatcher or Operator must then confirm it before the Foul Time becomes effective.

c. Releasing Foul Time

Once protection has been provided, it must be maintained until the employee who was granted the foul time has released the foul time. The release must include the employee's title and name, and the track designation and limits being released. This information must be repeated by the Dispatcher or Operator, and confirmed by the employee releasing the foul time before blocking devices are removed.

APPENDIX A-4 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 141. Inaccessible Track

Roadway Workers may establish working limits on a track not controlled by the Dispatcher or Operator, by making the track inaccessible at each possible point of entry through one of the following means:

1. A switch or derail aligned to prevent access to the working limits and secured with an effective securing device, and properly tagged. The effective securing device and tag may be removed only by direction of the employee in charge of the working limits.
2. A remotely controlled switch aligned to prevent access to the working limits and secured with a blocking device by the employee who controls the switch. Blocking device protection must not be considered in effect until it has been confirmed by the employee controlling the switch. Protection must be maintained until the employee who requested the protection has reported clear.
3. A disconnected rail.
4. A flagman assigned to hold trains and equipment clear of the working limits. Movements within working limits may be made only with permission of the employee in charge.

APPENDIX A-5 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 803. Placing or Operating Track Cars on Tracks

a. Tracks Where ABS or DCS Rules are in Effect

Form D line 2 and line 3 is the authority for the movement of track cars and must be obtained before track cars are placed or operated on a track where ABS or DCS rules are in effect. Three exceptions are:

1. Track car movements within yard limits in non-signaled DCS territory may be made with verbal permission of the Dispatcher (or Operator when authorized by the Dispatcher).
2. Track car movements at an interlocking may be made one track car length beyond the home signal into ABS or DCS territory for an immediate movement in the opposite direction. Such movements require verbal permission of the Dispatcher (or Operator when authorized by the Dispatcher).
3. Track car movements that will be performing maintenance within Working Limits may be made on verbal permission of the employee in charge as prescribed by Rule 135, part (d), "Movements within Working Limits."

Before issuing Form D lines 2 and 3 or granting verbal permission for a track car to shift at an interlocking as outlined in item (2) above, the Dispatcher must ensure that:

1. No trains have been authorized to move in the direction of the point to be occupied,
AND
2. Signals governing opposing and following movements are in Stop position,
AND
3. Blocking devices are applied to protect against opposing and following movements.
The Dispatcher must issue a copy of the Form D to all Operators involved.

b. Tracks Where ABS or DCS Rules Are Not in Effect

On tracks where ABS or DCS rules are not in effect and an employee is in charge of the track, track cars must not be placed or operated on the track unless authorized by that employee. Where no employee is in charge of the track, track cars may occupy the track without permission.

APPENDIX A-6 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 804. Additions to Form D Line 2

The Dispatcher may direct addressee(s) to add additional line 2 authorities to as specified direction Form D which is still in effect providing no new trains or track cars have been authorized to operate within the limits of the additional line 2. Before issuing additional line 2 authorities, protection as prescribed by Rule 803, "Placing or Operating Track Cars on Tracks", must be applied. Additional line 2 authorities will be added as follows:

1. The Dispatcher must contact the addressee(s), state his intent to give them an additional line 2 authority, and state the number and date of the Form D to which the line 2 authority will be added.
2. The Dispatcher will then transmit the additional line 2 authority and his initials. The addressee(s) will repeat the authority. The Dispatcher must not transmit the "time" of the addition to the addressee(s) until they have correctly repeated the authority. The addressee(s) must not act upon the additional authority until they receive the "time" of the addition.
3. The Dispatcher and the addressee(s) must record all additional information on line 2 of their Form D. When an additional line 2 authority is given to a track car, Form D line 3 authority may be issued or extended to authorize the track car to proceed past Stop Signal(s) at interlockings or controlled points. The Dispatcher must not transmit the "time" of the addition to the addressee(s) for the line 2 authority until the addressee(s) have correctly repeated both the line 2 and line 3. The Dispatcher and the addressee(s) must record all information on lines 2 and 3 of their Form D.

APPENDIX A-7 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 805. Track Car Following Other Movements

A track car with a specified direction Form D line 2 authority may be permitted to follow a train or another track car when Form D line 3 specifies the train or track car ahead. When no trains or track cars are ahead, "NONE" must be written on line 3 of Form D. When line 3 indicates a train or track car ahead, speed must be regulated as follows:

1. Passenger and truck type highway rail cars must operate at a speed that will allow stopping within one-half the range of vision, short of a train or track car.
2. All other track cars must operate at Restricted Speed. When the train or track car ahead clears the limits of the following track car's line 2 authority, the Dispatcher may authorize the following track car to operate at Normal Speed. To make this authorization, the Dispatcher must instruct the Track Car Driver or Foreman to add the words, "[insert applicable train or track car number] is clear at [time] [Dispatcher's initials]" to line 13 of the original Form D.

APPENDIX A-8 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 806. Train Following Track Car

Except in an emergency, a train must not be permitted to follow a track car into ABS or DCS territory. In an emergency, the Dispatcher may permit a train to follow a track car by issuing Form D line 2 and line 3 authority. The Dispatcher must instruct the train to operate at Restricted Speed on Form D line 13.

APPENDIX A-9 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 808. Clearing a Track Specified on Form D Line 2

When a track car clears the track specified on Form D line 2, the Form D authorizing the use of the track is fulfilled, and a new Form D must be issued for any further movement. The Foreman or Track Car Driver must report clear to the Dispatcher or Operator.

APPENDIX A-10 (for reference only. Refer to current NORAC Edition and any Special Instructions that apply)

NORAC Rule 815. Maximum Speeds

Track cars must not exceed the maximum freight train speed. In addition, the following maximum speeds apply to the movement of track cars:

Rail Detectors, Geometry Cars, and Psgr Type Highway Rail Cars50 MPH

All Other Track Cars30 MPH

All Types:

When backing up10 MPH

When diverting through switches10 MPH

When passing standing trains on adjacent tracks10 MPH

When pulling or pushing equipment10 MPH

When operating through self-guarded frogs or switch
point guards, or diverting through spring frogs1 MPH

When being passed by a train on an adjacent trackSTOP

EXCEPTIONS: The following "Specialized Equipment" is not required to be stopped while being passed by a train on an adjacent track:

1. Rail Grinders
2. Switch Grinders
3. Rail Detector Cars
4. Geometry Cars
5. GRMS (Gage Restraint Measurement System)
6. Catenary Repair Cars

[End of RWP Manual]

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APPENDIX C

MASSDOT MW-1

MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

**MAINTENANCE OF TRACK
AND SPECIAL TRACKWORK**



**Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116**

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MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

**MAINTENANCE OF TRACK
AND SPECIAL TRACKWORK**



Document No. _____

**Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116**

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MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

**MAINTENANCE OF TRACK
AND SPECIAL TRACKWORK**

**Director of Railroad Properties
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116**

Effective July 1, 2018



**Chalita Belfield
Director of Railroad Properties**

Date: July 1, 2018

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RECOMMENDED PRACTICE

FOR THE

MAINTENANCE OF TRACK AND

SPECIAL TRACKWORK

This Manual belongs to:

Name: _____

Employee #: _____

Address: _____

Phone: _____

If this Manual is found,
please return it to the address below:

Director of Railroad Properties
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

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MassDOT MW-1

MANUAL REVISIONS

We welcome your comments on the MassDOT Manual. Please send all suggestions to:

Director of Railroad Properties
Massachusetts Department of Transportation
10 Park Plaza, Suite 4160
Boston, MA 02116

Suggested revisions to this Manual should be submitted in writing in accordance with the following format.

Section/Paragraph Number _____

Page Number _____

Recommended Changes, Corrections, or Questions:

Submitted by:

Name _____

Operating Railroad Company _____

Address _____

Phone _____

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MassDOT MW-1

RECOMMENDED PRACTICE

The Massachusetts Department of Transportation (MassDOT) is committed to providing the safest and most efficient rail service to our customers by maintaining and upgrading the Commonwealth's track infrastructure and assets using best industry recommended practice.

MassDOT has sought to contract with Operating Railroad Companies that will work cooperatively with MassDOT, and that will maintain the Commonwealth's track system at the required standards with competent and dedicated employees.

MassDOT requires their designated Operating Railroad Companies to perform diligent inspections, prepare maintenance and repair programs, and ensure the proper maintenance of track in accordance with the governing operating agreements.

Recommended Practice is based on the best practice developed by and in current use on the United States and Canadian passenger and freight railroads. They allow for a common language amongst railroad administrators, maintenance personnel, contractors, material and equipment suppliers and all others concerned with railroad safety.

Each of the Operating Railroad Companies are currently under agreement with MassDOT. The information found in this Manual contains tables, instructions, and references designed for track and special trackwork as a guide for maintenance personnel in their everyday efforts to maintain a safe and efficient plant.

The MassDOT Manual is a manual of recommended practice. We recognize that best practice of maintenance of way (MOW) continues to change due to the location, environment, operation, and geographic conditions of individual railroads.

The MassDOT Recommended Practice Manual is meant to aid and assist the Operating Railroad Companies to maintain MassDOT-owned tracks in a safe and efficient manner at a reasonable cost. Performing maintenance in accordance with the recommended practice in the MW-1 will meet the expectations of the Commonwealth and provide uniform practice between the different properties of the Operating Railroad Companies.

As of July 2018, the Operating Railroad Companies operate rail freight service and maintain the MassDOT-owned track infrastructure pursuant to License and Operating Agreements with MassDOT on the following line segments:

- Adams Industrial Track: MP 0.0 to MP 5.2
- Conn River Main Line: MP 0.38 to MP 49.7
- Housatonic Railroad: MP 50.0 to MP 85.9
- Massachusetts Central Railroad: MP 1.6 to MP 25.0
- Framingham Secondary: MP 0.0 to MP 21.05
- Middleboro Subdivision:
 - Attleboro Secondary: MP 0.0 to MP 8.6
 - New Bedford Secondary: MP 8.6 to MP 13.3
 - Middleboro Branch: MP 13.3 to MP 21.1
- New Bedford Secondary: MP 13.3 to MP 31.8
- Fall River Secondary: MP 0.0 to MP 12.0
- Cape Main Line:
 - Buzzards Bay Secondary: MP 36.3 to MP 54.7
 - Hyannis Secondary: MP 55.0 to 78.5
- Falmouth Secondary: MP 0.0 to MP 6.8
- South Dennis Secondary: MP 0.0 to MP 2.8
- Dean Street Industrial Track: MP 0.0 to MP 1.5
- Watuppa Branch: MP 6.0 to MP 8.0

MassDOT MW-1

PURPOSE AND USE

The MassDOT MW-1 was developed for MassDOT Rail and Transit Division and selected Operating Railroad Companies who have contracted with MassDOT Rail and Transit Division to operate and maintain lines of track owned by the Commonwealth, as a manual of best practice for the maintenance of track and associated trackwork components. Materials presented in this handbook establish and define MassDOT Rail and Transit Division recommended practice for maintenance of track owned by MassDOT Rail and Transit Division and operated by Operating Railroad Companies under contractual agreements with MassDOT Rail and Transit Division. These practices have been developed to meet the needs of the MassDOT Rail and Transit Division and may be used exactly as presented or modified as is necessary and desirable to meet the present and future needs of the Railroads operating and maintaining MassDOT Rail and Transit Division rail lines, in accordance with the terms of the governing License and Operating Agreements.

In all cases, inspection and restoration of track must be performed in accordance with Federal Railroad Administration (FRA) Part 213, Track Safety Standards.

The intent of the recommended practice is not to establish artificially rigid procedures governing track maintenance but rather to serve as guidelines for prudent track maintenance practice. These guidelines must be used in concert with proper exercise of judgment based upon experience and knowledge of service requirements.

The maintenance limits in the MassDOT MW-1 are unique and are intended to supersede the inspection and restoration limits given in FRA Part 213, provided that the more restrictive practices should be followed. For example, the track gage limits given in the MassDOT MW-1 (53.0(M)) are more restrictive than the track gage limits found in FRA Part 213 (§213.53).

Track maintenance limits and recommended practice in the MassDOT MW-1 are to be used for everyday maintenance activities. The limits act as a trigger to prompt the maintenance or reconstruction of track. The track and related rail infrastructure must be maintained in accordance with the requirements of the relevant License and Operating Agreement between MassDOT Rail and Transit Division and the Operating Railroad

Company. The Commonwealth expects that wherever possible, track shall be maintained so that the track structure does not fall below track maintenance limits established in the MassDOT MW-1.

In all cases, MassDOT Operating Railroad Companies will strive to restore track, make track repairs, and maintain track at or above the respective maintenance limits given in the MassDOT MW-1.

The development of the MassDOT MW-1 involved many hours of input from railroad professionals, and represents the latest recommended practice approved by the MassDOT Director of Railroad Properties. It is understood that these practices are subject to revisions as new technology and improved techniques are established. Other practices may be found to be equally acceptable and, as a result, the materials contained in the MassDOT MW-1 may be modified from time to time to promote the understanding of and efficiency and economy of maintenance of MassDOT-owned rail lines.

The MW-1 is an interactive document. It is expected that every individual that has reason to use this document will constantly strive to offer suggestions and constructive criticism to improve the overall understanding, use, and quality of this Manual.

Modifications to these recommended practice materials must be made in writing, and incorporated into the Manual following approval by MassDOT Rail and Transit Division.

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MassDOT MW-1

RECOMMENDED PRACTICE

FOR THE

**MAINTENANCE OF TRACK
AND SPECIAL TRACKWORK**



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SUBPARTS A-E

RECOMMENDED PRACTICE FOR THE MAINTENANCE OF TRACK

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**RECOMMENDED PRACTICE FOR THE
MAINTENANCE OF TRACK
SUBPARTS A-E**

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Subpart A - General

§1.0(M) SCOPE

- (a) Maintenance is both spot and out-of-face replacement of components of the track structure such as laying new or relay rail or installing ties so as to maintain the infrastructure in a state-of-good repair.
 - (1) Maintenance limits are to be used as a triggering mechanism that prompts maintenance or reconstruction.
 - (2) It is MassDOT's policy to have a track structure that stays between new construction and maintenance limits.
 - (3) As the track structure wears, maintenance should be programmed before the track reaches the MassDOT maintenance limits.
 - (4) Should these maintenance limits be exceeded, maintenance must be completed prior to reaching the limits found in FRA Part 213.
 - (5) Whenever possible, track should be repaired or reconstructed to new track tolerances.
- (b) This subpart provides practices that will be used for the maintenance of track. It is for the guidance of Operating Railroad Companies that maintain and repair track.
- (c) This subpart contains "maintenance limits" that are to be used when maintaining track and are not to be confused with the minimum limits found in FRA Part 213 or with new track tolerances.

§3.0(M) APPLICATION

The MW-1 applies to all operating railroads that have maintenance and compliance responsibility on MassDOT-owned railroad property.

§5.0(M) MAINTENANCE

- (a) The responsible personnel in charge of performing the maintenance work for the Operating Railroad Companies shall be qualified to maintain, restore, or renew trackwork in accordance with FRA §213.7(a), (b), (c) and (d).
- (b) The person responsible for the work shall coordinate and report all maintenance work on the appropriate form to the Operating Railroad Company and MassDOT Rail and Transit Division.
- (c) A record of all maintenance performed and all required inspection reports shall be maintained by the Operating Railroad Company for the duration of their operating contract. Reports to be provided are as follows:
 - (1) Track Inspection Reports (planned and special)
 - (2) Switch Inspection Reports (planned and special)
 - (3) Rail Defect Inspection Reports:
 - Detector Car Report (car to be ridden by Operating Railroad Company Official)
 - Rail Failure Report
 - (4) Reports included in CWR procedures section (see Appendix A, "Continuous Welded Rail (CWR) Procedures").

§7.0(M) DESIGNATION OF QUALIFIED PERSONS TO SUPERVISE CERTAIN RENEWALS AND INSPECT TRACK

- (a) Each Operating Railroad Company to which this Part applies shall designate qualified persons to supervise restorations and renewals of track under traffic conditions. Each person designated shall have:
 - (1) At least:
 - (i) 1 year of supervisory experience in railroad track maintenance; or
 - (ii) A combination of supervisory experience in track maintenance and training from a course in track maintenance or from a college level educational program related to track maintenance;
 - (2) Demonstrated to the owner that he or she:
 - (i) Knows and understands the requirements of this Part that apply to the restoration and renewal of the track for which he or she is responsible;
 - (ii) Can detect deviations from those requirements; and
 - (iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and
 - (3) Written authorization from the track owner to prescribe remedial actions to correct or safely compensate for deviations from the requirements in this Part.
- (b) Each Operating Railroad Company to which this Part applies shall designate qualified persons to inspect track for defects. Each person designated shall have:
 - (1) At least:
 - (i) 1 year of supervisory experience in railroad track maintenance; or
 - (ii) A combination of supervisory experience in track maintenance and training from a course in track maintenance or from a college level educational program related to track maintenance;
 - (2) Demonstrated to the owner that he or she:
 - (i) Knows and understands the requirements of this Part that apply to the inspection of track for which he or she is responsible; and
 - (ii) Can detect deviations from those requirements; and
 - (iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and
 - (3) Written authorization from the track owner to prescribe remedial actions to correct or safely compensate for deviations from the requirements in this Part, pending review by a qualified person designated under Paragraph (a) of this section.
- (c) Individuals designated under Paragraphs (a) or (b) of this section that inspect continuous welded rail (CWR) track or supervise the installation, adjustment, and maintenance of CWR track in accordance with the written procedures of the track owner shall have:
 - (1) Current qualifications under either Paragraphs (a) or (b) of this section;
 - (2) Successfully completed a comprehensive training course specifically developed for the application of written CWR procedure issued by the track owner;
 - (3) Demonstrated to the Operating Railroad Company that the individual:
 - (i) Knows and understands the requirements of those written CWR procedures; and
 - (ii) Can detect deviations from those requirements; and

- (iii) Can prescribe appropriate remedial action to correct or safely compensate for those deviations; and
- (4) Written authorization from the Operating Railroad Company to prescribe remedial actions to correct or safely compensate for deviations from the requirements in those procedures and successfully completed a recorded examination on those procedures as part of the qualified process.
- (d) Persons not fully qualified to supervise certain renewals and inspect track as required in Paragraphs (a) through (c) of this section, but with at least one year of maintenance of way (MOW) or signal experience, may pass trains over broken rails and pull-aparts provided that:
 - (1) The Operating Railroad Company determines the person to be qualified and, as part of doing so, trains, examines, and re-examines the person periodically within two years after each prior examination on the following topics as they relate to the safe passage of trains over broken rails or pull-aparts: rail defect identification, crosstie condition, track surface and alignment, gage restraint, rail end mismatch, joint bars, and maximum distance between rail ends over which trains may be allowed to pass. The sole purpose of the examination is to ascertain the person's ability to effectively apply these requirements and the examination may not be used to disqualify the person from other duties. A minimum of four hours training is required for initial training;
 - (2) The person deems it safe and train speeds are limited to a maximum of 10 MPH over the broken rail or pull apart;
 - (3) The person shall watch all movements over the broken rail or pull apart and be prepared to stop the train if necessary; and
 - (4) Person(s) fully qualified under FRA §213.7 are notified and dispatched to the location promptly for the purpose of authorizing movements and effecting temporary or permanent repairs.

§8.0(M) QUALITY CONTROL

- (a) The person in charge of performing the maintenance activity or repair shall be responsible for the overall quality of the work performed.
- (b) All maintenance work shall be performed in accordance with this Part.
- (c) The Operating Railroad Company shall review the work performed for quality, consistency, and compliance to this Part.
- (d) Trackwork repairs that are deficient:
 - (1) Shall be brought to the attention of the Operating Railroad Company.
 - (2) May be cause for remedial action.
- (e) The Operating Railroad Company shall see that any additional work necessary is performed to bring the repair into compliance with this Part.
- (f) The Operating Railroad Company shall be responsible to re-inspect the corrected work to ensure that it is in compliance with this Part.
- (g) The Operating Railroad Company is encouraged to make recommendations to the MassDOT Rail and Transit Division as to required modifications to methods, procedures, and practice to improve the overall quality of the work.

§10.0(M) SIDINGS

Maintenance of Way (MOW) forces maintain up to the derail and/or property line on industrial siding tracks.

Subpart B - Roadbed and Right-of-Way

§31.0(M) SEASONAL PREPARATION AND MAINTENANCE

- (a) Fall/Winter
 - (1) Dig out switch (gas, electric) rods
 - (2) Check heaters
 - (3) Before winter, clean sand out of flange ways at all highway grade crossings
 - (4) Keep crossing ends and flanges clear of snow and ice
 - (5) Ensure adequate supplies of materials/tools and snow equipment
 - (6) Order frost spikes/shims
 - (7) Order rope and drift pins from approved supplier and prepare for usage (to heat rail)
 - (8) Clean snow from switches at switch points, frog points and guard rails
 - (9) Obtain cleaner and lubricate Sargeant and Greenleaf switch locks
- (b) Spring/Summer (Special Inspections after Acts of Nature)
 - (1) Verify proper neutral temperature of rail installed at less than the desired neutral temperature range and adjust as required (see Appendix A, "Continuous Welded Rail (CWR) Procedures").
 - (2) Plan vegetation control.
 - (3) Remove temporary shims/spikes.
 - (4) Bring winter equipment back to central headquarters.
 - (5) Perform heat patrol (kinks).
 - (6) Perform rain storm patrols – inspection and cleaning of culverts.
 - (7) Check and cross-cut joints in track.
 - (8) Lubricate main line hand throw and yard switches.

§33.0(M) DRAINAGE

- (a) Drainage is of prime importance for the maintenance of track. Water mixing with materials in the roadbed tends to make the entire track structure unstable.
- (b) Water seeping or flowing toward the track should be carried across and off the roadbed or be intercepted and diverted before it reaches the roadbed.
- (c) Water falling upon the roadbed should be quickly drained off to side ditches or drainage structures.
- (d) Every effort should be made to see that water from adjacent property does not drain on the MassDOT right-of-way. In areas where this condition is observed the MassDOT Rail and Transit Division shall be notified.
- (e) Cross drains should be installed and maintained, particularly where bridges, road crossings, and sags interfere with longitudinal drainage.
- (f) Maintenance of drainage systems must satisfy the requirements of FRA §213.33.
- (g) Distribution of track or construction materials, and the disposal of fouled ballast and ditch materials, should be handled in such a manner that they no longer interfere with track drainage.
- (h) Operating Railroad Company shall notify the MassDOT Rail and Transit Division any time debris is dumped on MassDOT property by abutters.

§33.1(M) Culverts

- (a) Culverts require regular inspection and maintenance as do other railroad structures. When making inspections of track and roadway, MassDOT's Operating Railroad Companies should:
- (1) Railroad shall have and maintain an updated list of all culvert locations within the right-of-way. Inspectors should be aware of the location of culverts within the right-of-way.
 - (2) The tie over the culvert should be painted white and web of rail shall be marked with mile post location.
 - (3) Be aware that culverts must not only support the live load of trains but the dead load of the track structure.
 - (4) Report the backup of water near culverts or any abnormal conditions around the ends of culverts (e.g., water seeping through ballast structure).
 - (5) Report any abnormal conditions found in the track structure at a culvert (e.g., loss of ballast). Operating Railroad Company shall then notify the MassDOT Rail and Transit Division.
 - (6) If unusual conditions are found at culvert locations, take appropriate remedial action. Appropriate remedial action shall be taken by a Operating Railroad Company qualified individual.
 - (7) For additional information on culverts, see American Railway Engineering and Maintenance Association (AREMA), Chapter I, Part 4, "Culverts."

§35.0(M) CROSS SECTION (ROADWAY)

Wherever possible, roadbeds, embankments, and excavations should be maintained in accordance with the Massachusetts Bay Transportation Authority (MBTA) Book of Standard Plans. Deviation from approved cross sections should not be made without authorization from the MassDOT Rail and Transit Division.

§37.0(M) VEGETATION

- (a) Growth of vegetation should be encouraged on slopes of embankments, cuts, and deep ditches to prevent erosion and to maintain stability.
- (b) Vegetation growth must be controlled in accordance with the requirements of FRA §213.37.
- (c) The goal of MassDOT is to have the right-of-way cleared of both brush and vegetation in the track and to within 25' of the track centerline. This should be accomplished using a combination of brush cutting and weed spraying.
- (d) Vegetation on railroad property, which is on or immediately adjacent to roadbed, must be controlled so that it does not:
- (1) Become a fire hazard to track-carrying structures;
 - (2) Obstruct visibility of railroad signs and signals;
 - (i) Along the right-of-way
 - (ii) At highway-rail crossings
 - (3) Interfere with railroad employees performing normal trackside duties;
 - (4) Prevent proper functioning of signal and communication lines; or
 - (5) Prevent railroad employees from visually inspecting moving equipment from their normal duty stations.
- (e) The Operating Railroad Companies shall develop and carry out vegetation management programs as required by MassDOT.

- (f) The Operating Railroad Companies shall provide copies of their approved management programs to the MassDOT Rail and Transit Division.

§39.0(M) SIGNS

- (a) Track signs and posts must be placed and maintained in accordance with either the MBTA Book of Standard Plans and/or AREMA Chapter 1, Part 7 Roadway Signs and operating special instructions. They should not be installed so as to interfere with signals or safety appliances.
- (b) The following is a list of the common signs, which are maintained by the Operating Railroad's Maintenance of Way Department:
- (1) Whistle Posts (see Paragraph (c) for placement)
 - (2) Permanent Speed Restriction Signs (see Operating Railroad Company Time Table Special Instructions) (MBTA Standard Plan No. 3304)
 - (3) Temporary Speed Signs (see Appendix D)
 - (4) Mile Posts (see appropriate Track Charts) (MBTA Standard Plan No. 3302)
 - (5) Station Markers (see Operating Railroad Company Time Table Special Instructions)
 - (6) End of Block (see Operating Railroad Company Time Table)
 - (7) Stop Boards (see Operating Railroad Company Time Table)
 - (8) Clearance Marker (fouling point) painted rail or ties in yellow
 - (9) Close Clearance Markers (MBTA Standard Plan No. 3312)
 - (10) Yard Limit Signs (see Operating Railroad Company Time Table) (MBTA Standard Plan No. 3304)
 - (11) Switch Targets (MBTA Standard Plan No. 3030)
 - (12) Spring Switch Markers (SS) (MBTA Standard Plan No. 3304)
 - (13) No Trespassing/No Dumping Signs (MBTA Standard Plan No. 3208)
 - (14) Cross Bucks (Passive) (MBTA Standard Plan No. 3388)
 - (15) Crossing Approach Circuit Signage (XC) at Highway Grade Crossing
 - (16) Emergency Notification Sign at all Public and Private Grade Crossings (as per FRA Requirements) (Manual on Uniform Traffic Control Devices (MUTCD) Figure 8B-5)
 - (17) Bridge Markers (undergrade and overhead bridges)
 - (18) Culvert Markers (mark on web of rail and paint ties white)
 - (19) Track Lubricator Signage
 - (20) Buried Cable Signs (MBTA Standard Plan No. 3344)
 - (21) Low Ground Clearance at Grade Crossings (MUTCD Figure W10-5 and W10-5P)
 - (22) Snow Flanger Sign (MBTA Standard Plan No. 3304)
 - (23) Will Not Clear Man on Side of Car (MBTA Standard Plan No. 3314)
- (c) Whistle post placement:
- (1) Whistle posts are placed 1,320' in advance of a public grade crossing so as to comply with Massachusetts General Law (MGL), Chapter 160 "Railroads," Section 138 "Warning to Public."

§41.0(M) HIGHWAY GRADE CROSSINGS

- (a) Typical grade crossing surfaces found on the MassDOT are as follows (see also MBTA Standard Plan Nos. 3100, 3106, 3108, 3120):
 - (1) Timber
 - (2) Timber and asphalt
 - (3) Asphalt with cut flangeways
 - (4) Asphalt with rubber rail seal
 - (5) Full depth rubber
 - (6) Full depth concrete
 - (7) Full depth rubber on the gage and rail seal and asphalt on the field side
 - (8) Special products as approved by the MassDOT Rail and Transit Division at grade crossings or at pedestrian crossings

§41.1(M) Placement of Devices at Grade Crossings

- (a) Whistle signs shall be installed in accordance with Commonwealth of Massachusetts requirements (see §39.0(M)(c)).
- (b) The design and placement of grade crossing signage, roadway signage, and appliances at both public and private grade crossings are governed by the Manual on Uniform Traffic Control Devices (MUTCD, see Part 8).
- (c) Low ground clearance at grade crossings (see the MUTCD).

§41.2(M) Highway Grade Crossing Maintenance

- (a) All roadway signs, highway traffic signal systems, and pavement markings are maintained by the municipality and/or Commonwealth.
- (b) The railroad warning devices whether passive or active are maintained by the Operating Railroad Companies.
- (c) At private grade crossings, any paving markings or highway signage is the responsibility of the roadway owner. The Emergency Notification Sign is the responsibility of the Operating Railroad Companies.
- (d) Crossings should be kept clean and attention given to the following:
 - (1) Drainage: sloping the surface, if necessary, and constructing underground drains, as required.
 - (2) Surface water flowing along the highway toward the railroad should be diverted before it reaches the tracks.
 - (3) The ends of the crossing shall extend at least 2' beyond the width of the highway. Crossing surface installed in a gated pedestrian walkway area should be restricted to the width of the sidewalk gate.
 - (4) It is recommended that the ends of the crossing surfaces be protected by either end deflector plate/ballast or asphalt to prevent against dragging equipment.
 - (5) Flangeways shall be 2-1/2" wide and not less than 2" deep. They must be kept clean at all times and free of debris, ice, and snow.
 - (6) Crossing surface materials and components should be inspected, aligned, and properly secured to the track structure so that the materials cannot damage rolling stock and/or motor vehicles. Crossing surface material that cannot be properly secured and/or repaired shall be removed and temporarily replaced with cold patch or asphalt.

- (7) The four quadrant site distances for vehicles approaching the highway grade crossing shall be kept as clear as practicable.
- (8) When installing or making general repairs to crossings, track alignment should be established by transit and/or mechanical lining devices.
- (9) The condition of crossing approaches is vital to the performance of a grade crossing. Special attention should be paid to the surface and alignment on the crossing approaches so that the ties are tamped and there is a smooth transition into the crossing area.
- (10) Special attention should be paid to the maintenance of joints and welds at crossing ends. This includes insulated and conventional track joints, as well as field and plant welds. When performing maintenance, track joints should be eliminated as soon as possible.
- (11) Joints must be avoided within the area of the crossing panel.
- (12) When working at a crossing, rail should be observed under load to determine if there is excessive rail movement. As track deflects under load, cut spikes tend to loosen. Loose and worn fastening systems should be repaired and/or replaced as necessary to minimize all track and crossing surface movement.
- (13) In an emergency (broken weld or rail), when welding joints within the limits of the crossing panel, closure welds may be made by the thermite process.
- (14) When changing a broken rail in a crossing, ensure that all clips, spikes, plates, and excessively worn components are replaced and secured. Galvanized clips should be installed. Ties should be tamped. Rails temporarily joined with joint bars should be field welded as soon as practicable. If the broken rail is replaced in CWR territory refer to Appendix A, "Continuous Welded Rail (CWR) Procedures" for proper rail adjustment procedures.
- (15) Use of gage rods in crossings is prohibited.
- (16) Fastening and clipping devices shall be used that do not interfere with the installation of the crossing surface materials.
- (17) Galvanized clips should be used in crossings with an elastic fastening system.
- (18) Seasonal clearing of silt and other debris from both crossing approaches.
- (19) Clean out flangeways in the Fall (e.g., sand and dirt).
- (e) All new crossings must be compliant with the Americans with Disabilities Act (ADA).
- (f) MassDOT has a number of different types of highway grade crossings types. Pictures of the more common types are shown below:
 - (1) Asphalt With Cut Flangeway (not recommended for mainline track except overnight during crossing renewals or for emergency repairs).



(2) Timber and Asphalt



(3) Timber



(4a) Full Depth Rubber with Rail Seal



- (4b) Full Depth Rubber with Rail Seal



- (5) Full Depth Concrete on Wood or Concrete Ties



- (6) Rubber Flangeway and Asphalt



Subpart C - Track Geometry

§53.0(M) GAGE

§53.1(M) Standard for Gage

- (a) The standard gage for track, measured between the running rails at right angles to the track, 5/8" below the top of rail, is 56-1/2".
- (b) Gage will be 56-1/2" unless specified by the MassDOT Rail and Transit Division.
- (c) When gaging is required, care should be taken to not adversely affect the alignment of the track. Changes in prescribed gage should be made in uniform increments as given in §53.2(M).
- (d) Gage shall be changed by adjustment of the rail opposite the line rail (preferred method).
- (e) In some cases, gage may be adjusted on the line rail only if the adjustment will improve line and ride quality (e.g., joint elbowed out on the line rail).
- (f) In cases where the line rail is re-aligned, re-spike line high rail and then re-gage the low rail.

§53.2(M) Maintenance of Gage

- (a) Gage shall be measured with a standard track gauge or other authorized devices. These devices must be checked daily prior to use for accuracy.
- (b) Maintenance shall be performed when gage reaches the following limits:

Gage Maintenance Limits			
Class of Track	Minimum (Inches)	Maximum (Inches)	Maximum Rate of Change in Gage per 31' (Inches)
1	56-1/8	57-1/2	1
2	56-1/8	57-1/4	3/4
3	56-1/4	57-1/4	3/4
4	56-1/4	57	1/2
5	56-1/4	57	1/2

- (c) Gage rods shall be applied only in emergency situations for temporary repair. Permanent repairs to gage should be completed as soon as possible. On main line tracks, gage rods shall only be installed in an emergency and removed as soon as possible.
- (d) When using gage rods in signal territory, insulated rods are to be tested by the Signal Maintainer prior to installation. When permanent repairs are completed, gage rods are to be completely removed.

§55.0(M) ALIGNMENT

Alignment is the horizontal location of a railroad as described by curves, spirals, and tangents.

§55.1(M) Maintenance of Alignment

- (a) Outer rails of curves and field side rails on tangents should be selected as the line rails. On single tangent track, either rail may be used as the line rail, however, the north or east rail is the preferred line rail. The same line rail shall be used for the full length of the track tangent.
- (b) In general, alignment information may be obtained using the following:
 - (1) The stringline method.
 - (2) Surveying equipment or a rail-mounted laser.
 - (3) The automatic geometry system on an approved tamper.
 - (4) Track geometry car.
- (c) Maintenance shall be performed when alignment values reach the limits given in the table below.
 - (1) Alignment deviation in curves, as defined in this table, is the difference in mid-ordinate value between adjacent stations and not the average of multiple stations (uniformity) as defined in FRA §213.55.
 - (2) The definition of alignment deviation used in this paragraph, allows the maintainer to achieve alignment tolerances that are more restrictive than those defined in FRA §213.55.

Alignment Maintenance Limits			
Class of Track	Tangent Track	Curved Track	
	The deviation of the mid-offset from a 62' chord may not be more than (Inches): ⁽¹⁾	The deviation of the mid-ordinate from a 31' chord may not be more than (Inches): ⁽²⁾	The deviation of the mid-ordinate from a 62' chord may not be more than (Inches): ⁽²⁾
1	3-3/4	N/A ⁽³⁾	3-3/4
2	2-1/4	N/A ⁽³⁾	2-1/4
3	1-1/4	7/8	1-1/4
4	1	3/4	1
5	1/2	3/8	1/2
Notes: <ul style="list-style-type: none"> (1) The ends of the line shall be at points on the gage side of the line rail, 5/8" below the top of the railhead. Either rail may be used as the line rail; however, the same rail shall be used for the full length of that tangential segment of track. (2) The ends of the line or chord must be at points on the gage side of the line rail, 5/8" below the top of the rail head. Use line rail in accordance with §55.1(M). (3) N/A – Not Applicable. 			

- (d) Designation of line rail:
 - (1) On tangent track in single track either rail or rail on the mile post side.
 - (2) On tangent track and multiple tracks the field side rail.
 - (3) In single or multiple tracks in curves on the high/outer rail.
- (e) Curve realignment changes in CWR territory must be made in accordance with Appendix A, "Continuous Welded Rail (CWR) Procedures."
- (f) Alignments must be maintained within the prescribed limits given above. Roadway clearances are prescribed in AREMA, Chapter 28 (see Table 28-3-3, "Legal Clearance Requirements by State" (in English Units)).

§55.2(M) Stringlining Curves

- (a) Stringlining of curves is a method for determining the most advantageous alignment that can be obtained with reasonable amounts of throw.
- (b) Any of the established numerical or mathematical methods, such as the automated geometry system on tampers, the "Bartlett Method" or "Bracket Method," may be used to calculate the throws of curves.
- (c) The practical relationship between station and chord length, mid-ordinate value, and degree of curvature for station lengths most commonly used is shown below:

Degree of Curve	Mid-Ordinate	Station Length	Chord Length
1°	1"	31'	62'
1°	1/4"	15'-6"	31'

- (d) In higher degree curves, shorter station lengths and chords are to be used. It may be desirable to use longer station lengths and chords for curves less than 30 minutes.
- (e) Basic stringlining principles:
 - (1) The mid-ordinates of a curve are indicative of its degree of curvature.
 - (2) The mid-ordinates of a uniform circular curve are equal when measuring offsets using chords of equal length.
 - (3) The mid-ordinate varies directly with the degree of curvature.
 - (4) Where track is thrown in or out at any single station on the curve, the mid-ordinate of the curve at the station is affected by the amount of the throw and the mid-ordinates at the adjacent stations are affected by half the throw amount, but in the opposite direction.
 - (5) All calculations should be checked to ascertain that the calculated throws will actually produce the required changes in mid-ordinates.

§55.2.1(M) Stringline Procedures: Road Worker Protection (RWP) and Personal Protection Equipment (PPE)

- (a) Ensure area to be stringlined has the proper RWP Procedures in effect.
- (b) A minimum of three people is required when using conventional stringline equipment.
- (c) Many curves have grease on the rails with residual amounts on the ties and ballast so caution needs to be taken when walking in areas to be stringlined.
- (d) Wear Operating Railroad Company's designated PPE, to include gloves that protect hands from getting dirty.

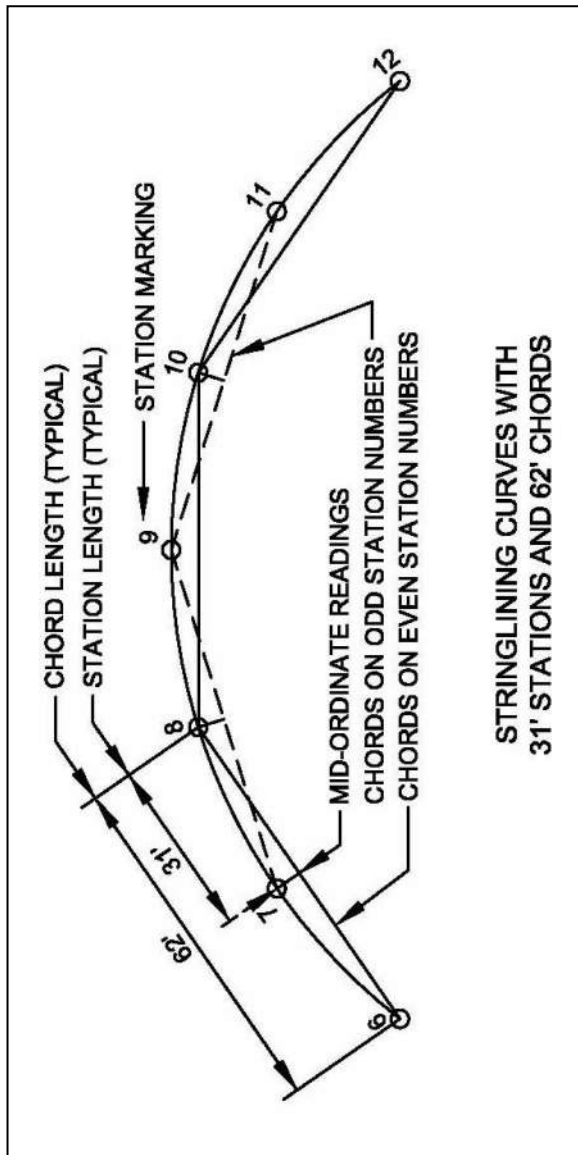
- (e) Ensure that all stringline equipment is cleaned after use.

§55.2.2(M) Stringline Procedures: Items/Tools Required:

- (a) Keel or crayon marker
- (b) Writing instrument
- (c) Stringline data sheet (as given below) with clip board
- (d) 100' cloth tape with 6' folding wood ruler
- (e) Stringline paddles with string
- (f) Ordinate ruler
- (g) Level board

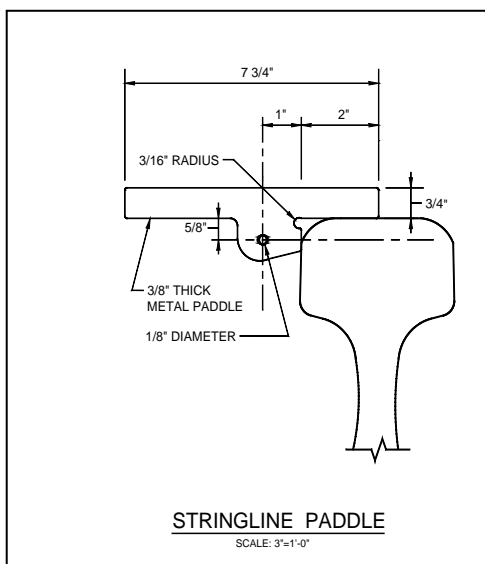
§55.2.3(M) Stationing Curves and Obtaining Stringline Data

- (a) The figure below shows a typical curve with stationing marked out in keel and the chords in place for measurement of mid-ordinates.
- (b) Ordinate readings are taken at odd and even stations.
- (c) A chord length of 62' is the chord used for this stationing.



Stringlining of Curves

- (d) Stationing shall begin at a point on the tangent far enough ahead of the curve to permit the measurement of any reverse curvature or "dog-leg." Stationing shall continue throughout the curve to a point on the tangent five stations beyond the tangent point to permit measurement of any reverse curvature. Mark stations on rail web with keel.
- (e) When obtaining mid-ordinate data, stringline paddles should be used to position the string a distance of 1" away from the gage line of the rail, so as to locate and permit measurement of any local deviations in the curve. A typical stringline paddle is shown below.



Note: In curved track, measurements are taken on the gage side of the high rail (line rail) if possible. If not, field side of low rail may be used.

- (f) The Stringline Data Form should be used to record field measurements and for making mathematical calculation (see §55.2.4(M)).
- (g) When a conventional ruler is used to measure the mid-ordinate, the actual scale reading should be recorded and a correction made to the mid-ordinate value to compensate for any offset of the stringline from the rail. Conventional stringline paddles require that 1" be subtracted from the readings taken to give the correct mid-ordinate value.
- (h) Mid-ordinate measurements should be taken (with an accuracy of 1/16" +/-) with the stringline pulled taut, not affected by the wind, and with the stringline paddles and the scale held horizontal and perpendicular to the gage face of the rail.

- (i) Track center lines should be measured and recorded at every station in a two or more track territory. The distance from centerline of track to any obstruction that might interfere with the lining of the curve should be measured and recorded so that limiting throws for these tight spots may be determined.
- (j) The apparent location of the curve points Tangent to Spiral (TS), Spiral to Curve (SC), Curve to Spiral (CS) and Spiral to Tangent (ST) should be noted when stationing the curve as appropriate so that the relationship between alignment and required superelevation can be determined.
- (k) At all station locations record:
 - (1) Crosslevel as read by a level board.
 - (2) Gage as read from the 6' ruler (or calibrated level board).
 - (3) Track centers if in multiple track territory.
 - (4) Physical features in the field such as crossings, turnouts, field or plant welds, joints, curve tags, bridge girders, grease pots, impedance boxes, etc., that may affect the ability to throw a curve.

55.2.4(M) Stringline Data Form

- (a) Below is an example of a Stringline Data Form to be filled out when stringlining a curve.

[illegible]

§57.0(M) CURVES: ELEVATION AND SPEED LIMITATIONS

§57.1(M) General

- (a) Elevation, or superelevation, is the vertical distance of the outer rail of a curve above the inner rail. It is provided to overcome or partially overcome the effects of curvature and speed.
- (b) Passenger railroads primarily elevate curves to provide adequate ride quality.
- (c) Freight railroads primarily elevate curves to provide ride quality and reduce rail wear.
- (d) Maximum authorized speed (MAS) for a curve is that specified in the current Operating Railroad Company's Employee Timetable.

§57.2(M) Superelevation

- (a) The MassDOT Rail and Transit Division shall establish the amount of superelevation and underbalance to be placed and maintained on each curve.
- (b) The superelevation should not exceed values given in Appendix C, "Underbalance Table - Maximum Allowable Operating Speed On Curves."
- (c) MAS shall be determined using 3" of unbalance (E_u).

§57.3(M) Superelevation Tags

- (a) Curves should be tagged in the field. Points to be marked or tagged on the curves are: TS, SC, CS, and ST.
- (b) Information on curve tags shall include the maximum design superelevation and the date the curve is elevated.
- (c) Superelevation tags are placed as follows:
 - (1) The TS and the ST tags are placed 1" off the tie plate and/or elastic fastener perpendicular to the high rail.
 - (2) The SC and CS tags are placed 1" off the tie plate and/or elastic fastener parallel to the high rail.

§59.0(M) Elevation of Curved Track; Runoff

- (a) If a curve or segment of a compound curve is elevated, the full elevation must be provided between points of full curvature throughout the curve, unless physical conditions do not permit. If the elevation does not extend throughout the curve, or segment of a compound curve, the minimum elevation must be used in determining the maximum allowable operating speed under FRA §213.57(b).
- (b) Elevation runoff must be at a uniform rate, within the limits of track surface deviation prescribed in FRA §213.63 and it must extend at least the full length of the spiral. If physical conditions do not permit a spiral long enough to accommodate the minimum length of runoff, a maximum of 1" elevation may be run off in tangent track.

Maximum Authorized Speed (MAS)	Maximum Rate of Change in 31'
Up to 59 MPH	1/2"
60 to 90 MPH	3/8"

- (3) At least 100' of tangent track, with zero crosslevel, shall be provided between the zero superelevation points in adjacent curves of opposite direction, or facing same hand turnouts, where practicable.

§61.0(M) CLEARANCES AND TRACK CENTERS

§61.1(M) Track Centers

- (a) In maintaining alignment, the existing track centers, including equivalent centers on curves, must not be reduced below the minimum established for the territory.
- (b) When surfacing track, any changes in track centers must be immediately reported to the Operating Railroad Company and the MassDOT Rail and Transit Division.
- (c) In maintaining alignment, existing track center distances, including equivalent distances on curves, should not be decreased without the authority of the MassDOT Rail and Transit Division.
- (d) If the measured track center in tangent track is less than 12'-6" notify the MassDOT Rail and Transit Division for guidance.
- (e) On curves, the tangent track center must be increased as follows (see MassDOT MBTA Plan 1018):
 - (1) Where the amount of superelevation is the same on adjacent tracks or the superelevation of the inner track is greater than the superelevation of the outer track, increase the tangent track center distance at a rate of 2" per degree of curve (CRDS(6)(D)(2)).¹
 - (2) Where the amount of the superelevation of the outer track is greater than the superelevation of the inner track:
 - (i) Increase the tangent track center distance at a rate of 2" per degree of curve and 3-1/2" for each 1" difference in elevation between the outer and inner tracks (and/or tracks under consideration) (CRDS(6)(D)(4)).¹
 - (3) When aligning and super-elevating curves, the required increase in track centers should be as given in Paragraphs (e) (1) and (2) of this Part.
 - (4) Track centers that do not meet the requirements of the MBTA Plan 1018 should be reported to the MassDOT Rail and Transit Division.
- (f) Standard Tangent Track Center Dimensions:
 - (1) The standard track center for tangent main line tracks is 14'-0".
 - (2) Track centers of 13'-0" are permissible where 14'-0" centers are not possible as approved by the MassDOT Rail and Transit Division (CRDS (6)(D)(1)).¹
- (g) Track clearance information is given in the MBTA Book of Standard Plans. See:
 - (1) Dwg. No. 1012: "Standard Clearances General Roadway Obstructions – Tangent Track"
 - (2) Dwg. No. 1013: "Standard Clearances at Stations – Tangent Track"
 - (3) Dwg. No. 1014: "Standard Clearances Tangent Track Signal Equipment & Utility Crossings"
 - (4) Dwg. No. 1015: "Clearances for New Overhead Bridges"
 - (5) Dwg. No. 1017: "Standard Clearances Tangent Track Bridges"
 - (6) Dwg. No. 1018: "Standard Track Centers & Side Clearance Increases for Curved Track"
 - (7) Dwg. No. 1019: "Clearances at Passenger Platforms"

¹ MBTA Commuter Rail Design Standards Manuals, Vol. I, Revision 1, April 19, 1996.

§61.2(M) Horizontal Clearances

(a) Side Clearance Increase Because of Curvature:

- (1) Side clearances must be increased on both the inside and outside of curves. This is to maintain equivalent tangent clearance on curves which is decreased due to:
 - (i) End overhang of equipment on the outside of curves, and;
 - (ii) Mid-ordinate swing-in on the inside or curves.
- (2) Required side clearances increase on both inside and outside of curves:
 - (i) 1.5" per degree of curve (AREMA Chapter 28, Section 1.1).
- (3) On curved track, side clearances shall be increased 1" per degree of curve. As recommended by AREMA Chapter 28, Section 1.1., Special Notes (1984), clearances to fixed obstructions should be increased within 80' of the curve (from TS and/or ST):
 - (i) Clearances to fixed objects within 80' of a curve should be increased at least as given in the table below:

Distance from Fixed Obstruction to Curve (TS and/or ST) (Feet)	Increase in Clearance Per Degree of Curve (Inches)
20	1-1/2
40	1-1/8
60	3/4
80	3/8

- (4) Also see MBTA Standard Plan No. 1018.
- (b) Side Clearance Increase Because of Superelevation:
- (1) Side clearances on the inside or low side of the curve must be increased to compensate for the inward lean of the equipment when a curve has superelevation.
 - (2) The increased side clearance amount required to clear an object and/or obstruction is:
 - (i) Increased side clearances required in inches

$$= h/5 \times E_A,$$

Where:

h = height of obstruction/object in feet above top of rail.

E_A = actual elevation in curve at point in question in inches.

- (3) See MBTA Standard Plan No. 1018.

§61.3(M) Vertical Clearances

- (a) The minimum preferred vertical clearance required by the Commonwealth of Massachusetts is 22'-6" above top of rail.
 - (1) See AREMA, Section 3.6, "Legal Clearance Requirements by State."
 - (2) See Table 28-33, for Massachusetts for both horizontal and vertical clearances.
- (b) Compensation for Superelevation:
 - (1) If tracks are superelevated under an overhead (OH) structure:

- (i) Vertical clearance must be increased to accommodate the required vertical clearance out to a point 7'-0" from the centerline of track on a plane parallel to the top of rail of the superelevated track (CRDS (6)(B)(3)).²
- (2) Relative to the low rail and/or grade rail, the required vertical clearance in superelevated curves is increased by the amount (inches) calculated below:
 - (i) Increase in Vertical Clearance Required = $143 E_A$
Where:
 E_A = Superelevation in curve at point of interest
- (c) Compensation in Vertical Clearance for Vertical Curves:
 - (1) When a vertical curve exists under an overhead structure and/or obstruction, additional clearance is required to:
 - (i) Accommodate the vertical mid-ordinate of railway equipment (cars and locomotives)
 - (2) For railway equipment up to 90' in length, the required increase in vertical clearance can be calculated as follows (CRDS(6)(B)(4)).²
 - (i) Increase in Vertical Clearance Required = $\frac{0.90 \times G_1 - G_2}{8}$
Where:
 G_1 = Grade at point on vertical curve (PVC) in percent
 G_2 = Grade at point on vertical tangent (PVT) in percent

§61.4(M) Clearance Limiting Objects

- (a) For clearance limiting objects, see AREMA, Chapter 28, Table 28-3-3 "Legal Clearance Requirements by State" and the MBTA Book of Standard Plans.
- (b) The clearance from the center line of track to objects within the right-of-way such as: signal appliances, signal bridge foundations, bridge abutments and platforms shall not be reduced without ascertaining that the final clearance to the object is no less than given in AREMA, Chapter 28, Table 28-3-3, "Legal Clearance Requirements by State" and the MBTA Book of Standard Plans.

§62.0(M) GRADES

§62.1(M) Grade Limitations

- (a) The maximum design gradient shall be 1-1/2% and may be exceeded only with the approval of the MassDOT Rail and Transit Division.
- (b) Storage and/or yard track grades shall be level where existing grades and obstructions permit.
- (c) When reconstructing track, the existing profile must be retained except where it is possible to reduce the severity, length or the number of grades.
- (d) Frequent changes in gradient shall be avoided as this introduces more vertical curves into the geometry and may degrade ride quality and increase train resistance.
- (e) The preferred minimum length of vertical tangent is 300'.
- (f) However, an absolute minimum length of 100' is required (unless approved by the MassDOT Rail and Transit Division).

² MBTA Commuter Rail Design Standards Manuals, Vol. I, Revision 1, April 19, 1996.

§62.3(M) Horizontal Curves/Minimum Tangent Lengths

- (a) For spiraled compound or reverse curves, the above minimum tangent length between spirals and/or curves is as follows:
 - (1) A minimum tangent length of 100' on main tracks.
 - (2) A minimum tangent length of 85' on secondary tracks.
 - (3) An absolute minimum tangent length of 65', if approved by the MassDOT Rail and Transit Division.

§63.0(M) TRACK SURFACE

§63.1(M) General

- (a) Track surface is the relationship of opposite rails to each other in profile and crosslevel.
- (b) Track profile is the running surface along the top of the grade rail.
- (c) Crosslevel is the difference in elevation across opposite rail heads measured at right angles to the track alignment.
- (d) The ideal surface is a uniform profile consisting of constant grades connected by vertical curves, with zero crosslevel on tangents and predetermined crosslevel on curves.
- (e) The profile of track being surfaced should not be raised above established grades, except as approved by the MassDOT Rail and Transit Division, who will give consideration to the required elevations and clearances:
 - (1) In tunnels; and
 - (2) Under overhead bridges/structures; and
 - (3) At interlocking plants; and
 - (4) Highway grade crossings.
- (f) Any encroachment upon the published minimum overhead or side clearances from a track will not be permitted.
 - (1) See AREMA, Chapter 28, Table 28-3-3, "Legal Clearance Requirements by State."

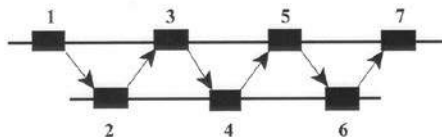
§63.2(M) Maintenance of Track Surface

- (a) The following criteria will serve as a practical guide for maintaining smooth riding conditions on existing tracks.
- (b) The basic tools for determining correct track surface are the standard track level and stringline. The track level should be checked by the employee inspecting the track prior to use. If found to be incorrect, it must be accurately adjusted or replaced. Other approved devices may be used for determining crosslevel, but their accuracy should be determined by comparison with a standard track level in correct adjustment.
- (c) When surfacing or raising track, one rail, which shall be the low rail on curves and usually the line rail on tangents, shall be selected as the grade rail. The other rail must be brought to surface by adjusting the crosslevel as required.
- (d) For Track Classes 1-5 track, surface may not deviate more than the amount prescribed in the following table.

Surface Maintenance Limits					
Track Surface	Class of Track				
	1	2	3	4	5
The runoff in any 31' of rail at the end of a raise may not be more than (inches):	2-5/8	2-1/4	1-1/2	1-1/8	3/4
The deviation from uniform profile on either rail at the mid-ordinate of a 62' chord may not be more than (inches):	2-1/4	2	1-5/8	1-1/2	1
The deviation from zero crosslevel at any point on a tangent or the reverse elevation on curves may not be more than (inches):	2-1/4	1-1/2	1-1/4	1	3/4
The difference in crosslevel between any two points less than 62' apart may not be more than (inches): ^{*(1, 2)}	2-1/4	1-1/2	1-1/4	1	3/4
*Where determined by engineering decision prior to June 22, 1998 due to physical restrictions on spiral length and operating practices and experience, the variation in crosslevel on spirals per 31' may not be more than (inches):	2	1-3/4	1-1/4	1	

Notes:

- (1) Except as limited by Part I, FRA §213.57(a), where the elevation at any point in a curve equals or exceeds 6", the difference in crosslevel within 62' between that point and a point with greater elevation may not be more than 1-1/2".
- (2) However, to control harmonics on Track Classes 2-5 jointed track with staggered joints, the crosslevel differences shall not exceed 1-1/4" in all of six consecutive pairs of joints, as created by seven low joints (see diagram below). Track with joints staggered less than 10' shall not be considered as having staggered joints. Joints within the seven low joints outside of the regular joint spacing shall not be considered as joints for purposes of this footnote.



§63.3(M) Surfacing Areas That Require Special Attention

- (a) Special attention must be given to the surface and line of track at the ends and approaches of bridges, crossings, and platforms.
- (b) When surfacing, installing or tamping ties, particularly in interlocking plants, care must be taken to avoid breaking or damaging bond wires, pipes, cables or wire connections to the tracks. The Signal Maintainer must be notified prior to any work and all signal appliances are to be marked with high-visibility paint. Notify the Signal Maintainer immediately if damage occurs. Care shall be exercised to avoid the dropping or laying of metal tools or objects across the rails and causing a shunt of the signal circuits.
- (c) In hot weather when surfacing track, the requirements of FRA §213.119 and Appendix A, "Continuous Welded Rail (CWR) Procedures" must be followed.
- (d) During freezing and thawing weather, attention must be given to the surface of track likely to be affected by heaving due to frost action. Surface irregularities due to frost action that cannot be corrected by usual procedures may be temporarily corrected by use of track shims or by de-icing the ballast. Shimming must be performed in compliance with FRA Part 213 and §129.0(M).
- (e) Undercutting, out-of-face track surfacing, and out-of-face tie renewal shall be performed in accordance with Appendix A, "Continuous Welded Rail (CWR) Procedures."

§63.4(M) Surfacing Track

- (a) When track is given a general raise, both rails should be raised at the same time. When track jacks are used, they should be placed opposite each other on the field side of the rail and must not be placed between the rails, except when absolutely necessary.
- (b) Surfacing track with automated tamping equipment causes ballast breakdown and, therefore, should only be performed where it is determined to be an effective solution to correct track geometry defects or to raise the track to a required profile. Surfacing work shall be executed in a manner that assures maximum durability of the track raise and the ballast materials.
- (c) When track is given a general raise, it is important to consider the relationship between the amount of lift and durability of results. In general, average lifts between 1" to 2" are desirable. Higher raises may be performed, with multiple passes, under the authority of the MassDOT Rail and Transit Division.
- (d) Adequate ballast for dressing to the required ballast cross section should be distributed in advance of surfacing and aligning track.
- (e) CWR track that has been surfaced and aligned and is being returned to service will be inspected by a qualified person before releasing and in accordance with Appendix A, "Continuous Welded Rail (CWR) Procedures."
- (f) Track should not be raised in interlockings or in signal territory until advance notice has been given to the Signal Maintainer so that switches, or other appliances, can be protected and then re-inspected when the work is completed.

Subpart D - Track Structure and Materials

§100.0(M) MATERIALS

"Track structure" materials include: sub-ballast, ballast, ties, rails, rail fastenings, and other track materials (OTM).

§100.1(M) Handling and Care of Materials

- (a) Moving materials from place to place and caring for materials on hand is costly and requires careful planning. Therefore, the amount of material on hand and the number of handlings should be kept to a minimum.
- (b) Threaded and/or insulated materials and parts should be kept under cover and protected from the weather.
- (c) Materials should be distributed in such a manner so as not to become a tripping hazard or be lost prior to installation in track.
- (d) Whenever possible, CWR distributed for installation should be distributed clear of the track.
 - (1) When necessary to be placed in the center line of the track, the rail ends should be protected by bending them towards the center line of track (proper nosing).
 - (2) When unloaded, CWR should be secured and insulated in such a manner as to prevent shunting of the signal system.
 - (3) The top of the CWR, when distributed in the center line of track, should not exceed the height of the running rails.

§100.2(M) Classification of Materials

- (a) Materials are classified as follows:
 - (1) New: Unused, as manufactured.
 - (2) Rehabilitated: Worn materials removed from track and repaired to a relay condition for reuse (e.g., rebuilt frogs).
 - (3) Relay: Usable (second-hand) material removed from track to be reused with no required work to be performed before re-installation into track, such as:
 - relay ties,
 - relay rail,
 - relay frogs,
 - relay joints,
 - relay fasteners,
 - relay turnouts, and
 - other special trackwork.
 - (4) Scrap: Materials removed from tracks that are not suitable for reuse.

§100.3(M) Removal and Disposition of Materials

- (a) Materials removed from track shall be classified as relay or scrap (see §100.2(M)).
- (b) Relay materials shall be sorted and stored properly and safely at the Operating Railroad Company's designated MOW materials area for reuse.
- (c) Scrap materials shall be disposed of by the Operating Railroad Company in accordance with MassDOT, local, State, and Federal regulations.

- (d) Reroller materials are used to fabricate other steel products (see §113.4.1(M)).
- (e) Materials shall be removed from the work area as quickly as practicable so as to provide for a clean, safe, right-of-way, and stored securely.

§103.0(M) BALLAST; GENERAL

§103.1(M) Ballast Characteristics

- (a) Unless supported by a structure, all track must be supported on a material that will:
 - (1) Transmit and distribute the load of the track and railroad rolling equipment to the sub-ballast and then to sub-grade.
 - (2) Provide lateral, longitudinal, and vertical restraint for the track.
 - (3) Provide drainage for the track structure.
 - (4) Facilitate the maintenance of track elevation, crosslevel, surface, and alignment.
- (b) Ballast shall conform to the AREMA recommended practice Chapter 1 and Part 2, Section 2.4 to include Tables 2-1 and 2-2. Ballast may be obtained only from MassDOT Rail and Transit Division approved quarries.
- (c) When ballast received is of inferior quality, has improper grading, or contains quantities of screenings, dirt, or foreign matter, it shall be rejected and shall be reported to the Track Supervisor, so that corrective action may be taken.

§103.2(M) Ballast Unloading

- (a) To the extent practicable, ballast should be unloaded in position for use with a minimum of rehandling and dressing.
- (b) Ballast must be distributed and immediately dressed so that adequate clearance below top of rail is provided for the movement of rolling stock and track equipment. Switches are not to be fouled and guard rails are not to be obstructed.
- (c) When unloading ballast cars, caution should be used to ensure that both sides of the car are unloaded equally to maintain the stability of the car while unloading.
- (d) Use the table given below to determine typical ballast quantities for track panels and special trackwork renewals.

Renewal Type	Number of Ballast Cars
Track Panels (3 each)	1
Crossing Frogs	1
No. 7, 8, 9, 10 Turnouts	2
No. 15 Turnouts	3
No. 20 and 24 Turnouts	4

§103.3(M) Ballast Section

- (a) Ballast and sub-ballast cross sections should conform to AREMA, Chapter 1, Section 2.1, "Design," Figures 1-2-1 through 1-2-4.
- (b) Minimum ballast shoulder widths are:
 - Jointed Rail 12" shoulder 2:1 slope
 - CWR Rail 12" shoulder 2:1 slope
 - CWR on curves 16" shoulder 2:1 slope

- (c) On CWR track, take remedial action where there is insufficient ballast (see Appendix A, “Continuous Welded Rail Procedures”).

§103.4(M) Fouled Ballast

- (a) Ballast may consist of crushed slag, crushed stone, screened gravel, pit-run gravel, chat, cinders, scoria, pumice, sand, mine waste, or other native material, and is an integral part of the track structure.
- (b) Ballast, regardless of the material, must satisfy all four of the requirements stated in the FRA Track Safety Standards.
- (c) The sole appearance of fouled ballast (ballast contaminated with broken down ballast particles, mud, coal dust, or any foreign particles), does not warrant a defect or violation to be written, if the ballast section is properly transmitting the load, restraining the track, providing adequate drainage, and maintaining proper geometry.
- (d) However, fouled ballast that is unable to provide adequate drainage is of particular concern because it compromises the ability of ballast to meet its other three functions (i.e., to distribute load, restrain track, and maintain proper geometry).
- (e) When fouled ballast with inadequate drainage is present, wheel loads are likely to be concentrated, rather than distributed, causing deterioration of components and instability in the area of the defective ballast.
- (f) This deterioration of components and instability increases the risk of track shift (such as a track buckle), and also increases the rate of degradation of geometry, and may result in a derailment.
- (g) Factors that affect the rate of degradation of components and geometry include the tonnage, traffic density, and operating speeds, as higher tonnage, traffic density, and operating speeds increase the amount and/or frequency the forces exerted on the components
- (h) Operating Railroad MOW personnel should look for indicators that the ballast is not performing its four functions, such as the existence of a crosstie and/or geometry condition.
- (1) The term “geometry condition” used here means a track surface, gage, or alignment irregularity that does not exceed the allowable threshold for the designated track class in the Track Safety Standards.
 - (2) Operating Railroad MOW personnel are encouraged to use their technical knowledge and professional experience in recognizing fouled ballast, and should take into account the severity of a geometry condition along with the following factors when considering the action and/or remedial action required:
 - Track class and operating speed
 - Traffic density and wheel loads
 - Adequacy of shoulder ballast and crib ballast
 - Track type: route for passenger and/or hazardous materials
 - Potential that the track may deteriorate very rapidly following heavy rains
 - Center-bound cross ties, if observable
 - Rail and fastener conditions
 - Sub-grade condition, if observable
 - Surrounding track structure (embankment or cut, obvious/observable variation of track stiffness of the left from right side of the track, and from the adjacent areas along the track)

- Proximity of the defective ballast locations to switches (special work), joints, bridges, or grade crossings
- Existence of standing water or indications that water had been standing (as water sometimes get trapped beneath the ties and may not be visible on the surface)

§103.5(M) Ballast Cleaning

- (a) When ballast in track becomes fouled, it should be mechanically cleaned, or removed, and then replaced to restore performance and proper drainage.
- (b) The type of cleaning procedure employed should depend on the nature and extent of the fouling.
- (c) Types of ballast cleaning and/or removal activities are described below:
 - (1) Shoulder ballast cleaning promotes lateral drainage of the track structure. A proper cycle of shoulder cleaning can aid in extending the cycle between undercutting operations.
 - (2) Undercutting cleans the ballast under the track to include the ties, cribs, and shoulders.
 - (3) A portion of the ballast removed may be returned to the track for reuse if approved by the MassDOT Rail and Transit Division.
 - (4) See Appendix A, "Continuous Welded Rail (CWR) Procedures," for the proper procedures for shoulder cleaning and undercutting of track with CWR.

§103.6(M) Ballast Gradation

- (a) The nominal size of crushed stone used for ballast in maintenance and new construction shall be as follows (unless otherwise directed by the MassDOT Rail and Transit Division):

All tracks:

Ballast Size AREMA No. 4 3-4" to 1-1/2"

§109.0(M) CROSSTIES

- (a) Crossties shall be made of a material for which rail can be securely fastened. A crosstie must have effective rail fasteners on both the gage and field side of both rails to be considered an effective tie.
- (b) Each 39' segment shall have:
 - (1) A sufficient number of cross ties which in combination provide effective support that will:
 - (i) Hold gage within limits prescribed in FRA §213.53(b);
 - (ii) Maintain service within the surface limits prescribed in FRA §213.63; and
 - (iii) Maintain alignment within the limits prescribed in FRA §213.55.
 - (2) The minimum number and type of crossties specified in this section must be effectively distributed to support the entire segment; and
 - (3) At least one non-defective crosstie of the type specified in this section that is located at a joint.

- (4) The minimum number of effective crossties as listed in the table below:

Minimum Number of Effective Crossties			Maximum Distance Between Effective Ties (Center to Center) (Inches)	Maximum Number of Successive Defective Ties (Normal Spacing)
Class of Track	Tangent Track and Curves $\leq 2^\circ$	Turnouts and Curve Track $> 2^\circ$		
1	5	6	100	3
2	8	9	74	2
3	8	10	74	2
4 and 5	12	14	50	1

§109.1(M) Dimensions of Crossties

- (a) Wood crossties are 7" in depth, 9" in width and 8'-6" in length (unless otherwise authorized by the MassDOT Rail and Transit Division).
- (b) Timber crossties shall be of the following sizes:

Type of Track	Size
Main Line Track	7" grade (7"x9" x 8'-6")
Other Than Main Track and Yard Tracks	6" grade (6"x8" x 8'x6")
Grade Crossings	7" x 9" x 9', 7" x 9" x 10' ⁽¹⁾
Note: ⁽¹⁾ Or as recommended by manufacturer.	

- (c) The specifications for wood crossties shall be in accordance with AREMA, Chapter 2.
- (d) Wooden transition ties may be used at open deck bridge approaches. Transition tie layout is to be approved by the MassDOT Rail and Transit Division.
- (e) Concrete and steel ties may be used with the approval of MassDOT Rail and Transit Division.
- (1) Concrete ties shall be sized according to MBTA Standard Plan 1120.

§109.2(M) Use of Crossties

- (a) The use of crossties, other than those described in §109.1(M), shall be approved by the MassDOT Rail and Transit Division.
- (b) The type and spacing of ties for each line and class of track shall be designated by MassDOT.
- (c) The number of ties and tie spacing for each line and class of track shall be designated by the MassDOT Rail and Transit Division in accordance with the service requirements. Center to center tie spacings are given in the table below:

Type of Track	Distance (Inches)
Main Tracks	19-1/2"
Within Grade Crossing ⁽¹⁾	18"
Other Tracks	22"
Concrete Ties	24"
Steel Ties ⁽¹⁾	20"-24"
Note: ⁽¹⁾ Or as recommended by the manufacturer.	

- (d) It is recognized that ties will not normally be re-spaced except during reconstruction.
- (e) However, when ties are installed out-of-face, ties should be re-spaced wherever practicable.

§109.3(M) Placement of Crossties

- (a) Wood Crossties
 - (1) Ties should be placed in track with the wider heart wood face down and square to the line of the rail.
 - (2) The ends of standard 8'-6" ties should be brought to a uniform line 18" from the edge of the base of rail on the line side as follows:
 - (i) On single tangent track, line the ties to the mile post side of the track.
 - (ii) On roads with two or more main tracks, line the field ends of ties.
 - (iii) On all curved track, ties shall be lined to the high rail.
 - (iv) When necessary to install non-standard length ties, they shall be centered in the track.
- (b) Any Crossties
 - (1) Ties shall be kept sufficiently spaced and square to the line of rail to permit proper tamping and distribution of load.
 - (2) When necessary, ties should be re-set to standard spacing.
 - (3) Ties shall be square to the line of rail so that fastening systems are not subjected to a torsional load because of tie skewing.
 - (4) When installed, crossties shall be properly tamped 12" on both sides of the base of rail.

§109.4(M) Preventing Crosstie Damage

- (a) General:
 - (1) When handling or spacing ties, care shall be taken not to damage them with MOW equipment, picks, and spiking hammers.
 - (2) Tie tongs, lining bars and other suitable tools or tie spacing equipment shall be used, so as to prevent tie damage.
 - (3) For additional information on fastener application see §127.0(M).
- (b) Wood Crossties:
 - (1) Adze ties as required to obtain a sound and true bearing to support the tie plate.

- (2) If a tie will be reused, cedar tie plugs or an approved hole filler must be used to fill holes where spikes, pins and lag screws have been removed. The tie shall be installed with hole side up.
- (3) Square tie plugs (5/8") are used with spikes and pins, round tie plugs (3/4" diameter) are used with lag screws.

§110.0(M) Switch Timber

- (a) Timber switch ties shall be 7" grade (7" x 9"), except for power switch machine timbers, which shall be a cross section of 9" x 10", with lengths as shown on the standards plans.
- (b) Use of switch timbers of other material must be approved by the MassDOT Rail and Transit Division.

§111.0(M) Bridge Timber

- (a) Oak or Southern Yellow Pine Timber, or approved equal by the MassDOT Rail and Transit Division, shall be used on all open deck bridges.
- (b) Bridge ties shall be adzed, framed, and sized according to framing plans prior to treatment. Suitable holes must be bored for drive spikes that fasten tie spacing bars on timbers.
- (c) Where ties are bored or adzed in the field, they shall be treated with an appropriate preservative.
- (d) Bridge ties shall be fastened to the structure with galvanized hook bolts as follows:
 - On tangent track every 4th tie shall have two hook bolts to connect the tie to the deck, or
 - On curved track every 3rd tie shall have two hook bolts to connect the tie to the deck; or
 - The MassDOT Rail and Transit Division shall specify how many ties shall have hook bolts that connect ties to the deck on any and all spans.
- (e) Lag screws shall be used in holes bored to size to fasten galvanized tie spacing bars on timber (see MBTA "Standard Book of Plans").
- (f) Tie spacing bar, spacer block, and hook bolt details are given on MBTA Standard Plan No. 1236 "Bridge Timber Anchoring Detail."
- (g) All open deck bridges shall have spacer blocks between all timber (see MBTA "Standard Book of Plans").

§113.0(M) RAIL

§113.1(M) Branding and Stamping

- (a) Branding shall be rolled in raised characters on the side of the web of each rail at a minimum of every 16' in accordance with the following requirements:
 - (1) The data and order of arrangement of the branding shall be as shown in the following typical brand:

136	RE	Manufacturer	2003	III or 3
(Weight)	(Section)	(Mill Brand)	(Year Rolled)	(Month Rolled)

- (2) The method of hydrogen elimination shall be located in the brand when a hydrogen elimination method other than Vacuum Treated (VT) is used.

- (b) The web of each rail shall be hot stamped a minimum of three times per rail (short rails must contain a minimum of one full stamp) on the side opposite the brand, and shall not occur within 2' of either end of rails, and in accordance with the following requirements:

- (1) The data shall be shown in the following typical stamping. The height of the letters and numerals shall be 5/8".

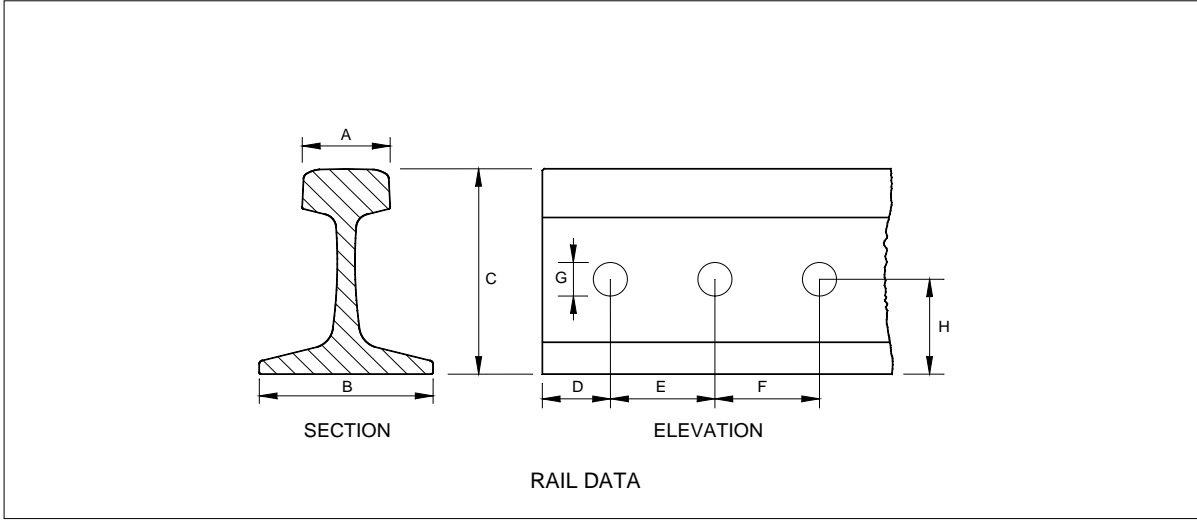
SS, HH, LA, IH or LH	297165	PSTU	12	BC
(Rail Type)	(Heat Number)	(Rail Letter)	(Strand and Bloom Number)	(Method of Hydrogen Elimination, if indicated in stamping)
Notes: SS = Standard Strength HH = Head-Hardened LA = Low Alloy Standard Strength IH = Low Alloy Intermediate LH = Low Alloy Head-Hardened				

- (2) Rails from continuous cast blooms shall be identified by a designation for heat number, strand number, and bloom number. The rail shall be identified by an alphabetical designation beginning with "P", and succeeding "S", "T", "U", etc., consecutively, or any other identification of the position of the rail within the cast, as agreed between the purchaser and manufacturer.
- (c) Markings:
- (1) High-strength rails shall be marked by either a metal plate permanently attached to the neutral axis, hot stamped, or in the brand which gives the manufacturer, type, and/or method of treatment. Heat-treated rail shall be paint-marked orange. Alloy rail shall be paint-marked aluminum color.
 - (2) Non-AREMA (Industrial Quality) rails shall be paint-marked yellow.
 - (3) Short rails (less than 80') shall be paint-marked green.
 - (4) Trackwork rails shall be paint-marked white.
 - (5) Rail length shall be painted on the end faces or in a manner acceptable to the purchaser or manufacturer.
 - (6) Individual rails shall be paint-marked only one color, according to the order listed above.
 - (7) Industrial Quality (IQ) rails shall be permanently identified by grinding diagonally through every "RE" or other designation within the rails' branding. Each designation brand shall be ground or milled diagonally from the top right hand corner to the bottom left hand corner, a minimum of 1/4" in width and to within 0.010" of the parent rail web surface.
- (d) For further information on this subject see AREMA 2.1.6.

§113.2(M) Rail End Drilling and Bolt Hole Sizes

- (a) Jointed rails consist of conventional length rails of 400' or less which are bolted together.

- (b) CWR is continuous welded rail in strings of greater than 400' where the rails are welded by the flash butt process or by other methods as approved by MassDOT.
- (c) Rail size dimensions and bolt hole drilling for typical rail sections are given in the following table.
- (d) A rail and joint dimension table with some typical MassDOT rail sections is contained below.



Rail Data (Inches)														
Rail Section Dimensions In Inches	80# A.S.	85# A.S.	100# NH	105# DY	107# NH	112# R.E.	115# R.E.	119# R.E.	130# R.E.	131# R.E.	132# R.E.	136# R.E.	140# R.E.	141# R.E.
A - Head Width	2-1/2	2-9/16	2-3/4	3	2-3/4	2-23/32	2-23/32	2-21/32	2-15/16	3	3	2-15/16	3	3-1/16
B - Base Width	5	5-3/16	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	6	7	6	6	6	6
C - Height	5	5-3/16	6	6	6-1/8	6-5/8	6-5/8	6-13/16	6-3/4	7-1/8	7-1/8	7-5/16	7-5/16	7-7/16
D - Drilling (1 st Hole)	1-15/16	1-15/16	2-1/2	2-3/4	2-1/2	2-7/16	3-1/2	3-1/2	2-3/8	2-1/2	3-1/2	3-1/2	3-12	3-1/2
E - Drilling (2 nd Hole)	7	7	7	5-5/8	7	7	6	6	7	6-1/2	6	6	6	6
F - Drilling (3 rd Hole)	-	-	-	5-5/8	-	6	6	6	NA	6-1/2	6	6	6	6
G - Diameter of Bolt Hole	1	1	1	1-1/16	1	1-1/8	1-1/8	1-1/8	1-11/32	1-1/8	1-1/4	1-1/4	1-1/4	1-1/4
H - Base to Center of Hole	2-3/16	2-9/32	2-39/64	2-5/8	2-39/64	2-7/8	2-7/8	2-7/8	2-3/4	3-3/32	3-3/32	3-3/32	3	3-3/32
I - Diam. of Bolt	7/8	7/8	7/8	15/16	7/8	1	1	1	1-1/8	1	1-1/8	1-1/8	1-1/8	1-1/8
Note: ¹ Source: AREMA Plan Nos. 4-1-6, 4-1-7, 4-3-13														

§113.3(M) Recommended Maintenance Wear Limits for Rail

§113.3.1(M) Maximum Head and Gage Face Wear for Rail (In and Out of Track)

- (a) With traffic, the rail head wears vertically and horizontally. As this wear increases, the cross section of the rail decreases. This decrease in rail section may overstress the rail causing rail failure.
- (b) The following table contains the maintenance wear limits for maximum vertical wear and maximum gage face wear (both gage and field) for rail sections commonly found on MassDOT rail lines.
- (c) Rail that has head and gage face wear, as given in the table below, shall be immediately removed from track and scrapped as soon as practicable.
- (d) Rail replacement should be programmed prior to reaching the given maintenance rail wear limits.

§113.3.2(M) Railway Limits for the Welding of Relay Rail

- (a) The table below gives the maximum head wear and gage face wear values recommended by AREMA for the welding of relay rail.
- (b) Relay rail that has greater amounts of either head wear and/or gage face wear should not be welded.
- (c) Maximum wear values are given for both mainlines and for other tracks to include light density mainlines, sidings, and other tracks.

Recommended Maintenance Maximum Rail Wear Limits ⁽¹⁾							
Rail Section	New Rail Height (Inches)	Allowable Head Wear (Inches)		New Rail Head Width ⁽²⁾ (Inches)	Allowable Gage Face Wear (Inches)		
		Mainlines	Other Tracks		Mainlines	Other Tracks	Total Head Width Wear ⁽³⁾ for Mainlines and Other Tracks
80 AS	5	5/16	3/8	2-1/2	5/16	3/8	1/2
85 AS	6	3/8	7/16	2-9/16	5/16	3/8	1/2
100 NH	6	1/2	5/8	2-3/4	3/8	1/2	1/2
105 DY	6	1/2	5/8	3	3/8	5/8	1/2
107 NH	6-1/8	1/2	5/8	2-3/4	3/8	1/2	1/2
112 RE	6-5/8	1/2	5/8	2-23/32	3/8	1/2	1/2
115 RE	6-5/8	1/2	5/8	2-23/32	3/8	1/2	1/2
119 RE	6-13/16	1/2	5/8	2-21/32	3/8	5/8	1/2
130 RE	6-3/4	1/2	5/8	2-15/16	3/8	3/4	3/4
131 RE	7-1/8	5/8	1/2	3	1/2	3/4	3/4
132 RE	7-1/8	5/8	1/2	3	1/2	3/4	3/4
136 RE	7-5/16	5/8	3/4	2-15/16	1/2	3/4	3/4
140 RE	7-5/16	5/8	3/4	3	1/2	3/4	3/4
141 RE	7-7/16	5/8	3/4	3-1/16	1/2	3/4	3/4
Notes: ⁽¹⁾ Rail that has maximum wear as given in this table shall be removed from track immediately and scrapped as soon as practicable. ⁽²⁾ Measure gage face wear at 5/8" below top of crown of railhead. ⁽³⁾ Combine field and gage side wear 5/8" below top of crown of railhead. This wear column only applies to rail that has been transposed.							

Rail Wear Limits for the Welding of Relay Rail ⁽⁵⁾							
Rail Section	New Rail Height (Inches)	Maximum Allowable Head Wear (Inches)		New Rail Head Width ⁽²⁾ (Inches)	Maximum Allowable Gage Face Wear ⁽¹⁾ (Inches)		
		Mainlines/ AREMA Class 2	Other Tracks/ AREMA Class 3		Mainlines/ AREMA One Side Class 2	Other Tracks/ AREMA One Side Class 3	Total Head Width Wear ⁽³⁾ / AREMA Both Sides Classes 2 and 3
80 AS	5	N/A	N/A	2-1/2	N/A	N/A	N/A
85 AS	6	N/A	N/A	2-9/16	N/A	N/A	N/A
100 NH	6	1/8 ⁽⁴⁾	N/A	2-3/4	3/16 ⁽⁴⁾	N/A	3/16 ⁽⁴⁾
105 DY	6	1/8 ⁽⁴⁾	N/A	3	3/16 ⁽⁴⁾	N/A	3/16 ⁽⁴⁾
107 NH	6-1/8	1/8 ⁽⁴⁾	N/A	2-3/4	3/16 ⁽⁴⁾	N/A	3/16 ⁽⁴⁾
112 RE	6-5/8	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	2-23/32	3/16 ⁽⁴⁾	5/16 ⁽⁴⁾	3/16 ⁽⁴⁾
115 RE	6-5/8	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	2-23/32	3/16 ⁽⁴⁾	5/16 ⁽⁴⁾	3/16 ⁽⁴⁾
119 RE	6-13/16	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	2-21/32	3/16 ⁽⁴⁾	5/16 ⁽⁴⁾	3/16 ⁽⁴⁾
130 RE	6-3/4	N/A	N/A	2-15/16	N/A	N/A	N/A
131 RE	7-1/8	1/4 ⁽⁴⁾	1/2 ⁽⁴⁾	3	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	3/16 ⁽⁴⁾
132 RE	7-1/8	5/16 ⁽⁴⁾	9/16 ⁽⁴⁾	3	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	3/16 ⁽⁴⁾
136 RE	7-5/16	5/16 ⁽⁴⁾	9/16 ⁽⁴⁾	2-15/16	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	3/16 ⁽⁴⁾
140 RE	7-5/16 ⁽⁴⁾	5/16 ⁽⁴⁾	9/16 ⁽⁴⁾	3 ⁽⁴⁾	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	3/16 ⁽⁴⁾
141 RE	7-7/16 ⁽⁴⁾	3/8 ⁽⁴⁾	5/8 ⁽⁴⁾	3-1/16 ⁽⁴⁾	1/4 ⁽⁴⁾	3/8 ⁽⁴⁾	3/16 ⁽⁴⁾
Notes: ⁽¹⁾ Measure gage face wear at 5/8" below top of crown of railhead. ⁽²⁾ Combine field and gage side wear 5/8" below top of crown of railhead. This wear column only applies to rail that has been transposed. ⁽³⁾ Rail classified as AREMA Class 1 or 2 may be used in any track without restriction. ⁽⁴⁾ Rail classified as AREMA Class 3 may be used in light density mainlines, sidings, and all other tracks. ⁽⁵⁾ AREMA values from "Rail Grading Classification by Wear Table 4-3-17."							

§113.3.3(M) Classification and Identification of Rail for Reuse (In and Out of Track)

- (a) By mill inspection, rails are to be classified and identified by paint marking as follows:

Type of Rail	Marking
Standard Carbon Rails	None
Head-Hardened Rails	Orange
Rails not 39 ft. or 80 ft. in length	Green
Relay Rail Pre-Tested	Green
Relay Rail Not Tested	Yellow
Industrial Quality Rail	Per Mill

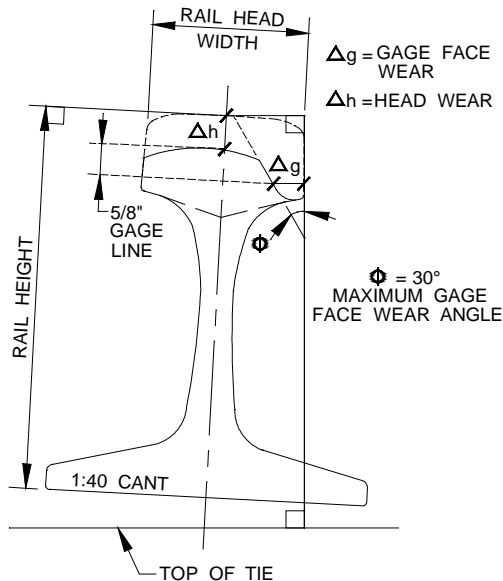
- (1) High-strength rails shall be marked by either a metal plate permanently attached to the neutral axis, hot stamped, or in the brand. The information will include the manufacturer and type and/or method of treatment. (Fully heat-treated rails are no longer available and are not to be used unless approved by MassDOT Rail and Transit Division.)
 - (2) Individual rails shall be paint-marked only one color according to the above, or as agreed to by MassDOT Rail and Transit Division and the manufacturer.
 - (3) Paint marking will appear on the top of the head of one end of the rail only, at least 3' from the end.
 - (4) All short length rails produced shall have the length identified in a manner acceptable to MassDOT Rail and Transit Division and the manufacturer on top of the head of the rail approximately 1' from each end.
- (b) Failed Rails:
- (1) Rails removed from track on account of any defects listed in FRA §213.113(a), except end defects described in Paragraph (2) below, must have the top of the head noticeably damaged at the defect using a cutting torch or abrasive saw, so that they will not be mistakenly returned to service in track, or be butt welded in fabricating strings of fit CWR. These rails will also be marked with red paint on the running surface near the ends of the rail. Such failed rails, damaged as above, are to be classified for scrap in its proper category.
 - (2) Rails removed from track on account of end defects only, such as a bolt hole crack or head-web separation where a portion of the rail end is not physically broken out, must have the top of the rail head noticeably damaged at the location of the defect using a cutting torch or abrasive saw to insure that a rail of this type is not returned to service in track without cropping the defective end.
 - (3) Any rail containing longitudinal or transverse defects must be removed in its entirety (all rail between joints in bolted rail, and all rail between plant welds, between plant and field welds, or between field welds in CWR). These rails will also be marked with red paint on the running surface near the ends of the rail. The entire rail is then to be considered as scrap rail. Rails removed from track on account of any defects listed in FRA §213.113(a), except end defects described in Paragraph (2) above, must have the top of the head noticeably damaged at the defect using a cutting torch or abrasive saw, so that they will not be mistakenly returned to service in track, or be butt welded in fabricating strings of fit CWR.

§113.3.4(M) Transposing and Turning Rail on Curves

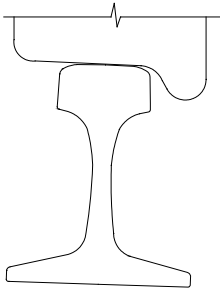
- (a) To obtain the maximum service life of rails on curves, the high and low sides should be transposed before horizontal wear, vertical wear or flow of metal in the head makes this impractical because of undesirable rail head stresses that may be produced leading to possible failure of the rail itself.
- (b) In general, high and low sides should be transposed when the horizontal wear on the high rail is between 3/8" and 5/8" in the full body of the curve, and before the metal in the low rail flows excessively.
- (c) In general, high side rails may be turned when horizontal wear does not exceed 1/2".
- (d) 112 lb. and 131 lb. rail must not be turned or transposed without the permission of the MassDOT Rail and Transit Division.

§113.3.5(M) Gage Face Angle (Worn Rail)

- (a) When a rail is placed in track, under traffic, the gage face wears at an angle (ϕ). As this angle increases, the possibility for a wheel to climb the gage face of a rail and derail increases.
- (b) As shown on the following diagram, rail replacement shall be accomplished when the gage face angle (ϕ) exceeds 30°. As the rail wear readings approach 30°, the Operating Railroad Company should make necessary plans to change out the rail.



- (c) For an example of new wheel and new rail interface, see the following diagram.



§113.4(M) Rail Classifications

§113.4.1(M) Defective Rails

- (a) Rails removed from track on account of any defects listed in FRA §213.113(a), except end defects described in Paragraph (c) below, must be marked “NG” (no good) and a torch mark made in the head of the rail.
- (b) Rails removed from track with end defects, such as bolt hole cracks or head-web separations where a portion of the rail end is not physically broken out, must have the top of the rail head noticeably damaged at the location of the defect, using a cutting torch or power saw to insure that a rail of this type is not returned to service without cropping off the defective end.
- (c) “Reroller Rails/Rail Steel No. 1” are rail steel materials that are recycled as used to fabricate other steel products to include bars and shapes. Reroller rail generally has a higher value than rail scrap. Reroller rail includes:
- Standard section tee rails with a weight of 50 lbs/yard or greater which are free of all attachments;
 - Rails that have no excessive pitting;
 - Rails that are free of all debris (e.g., concrete, mud, asphalt, etc.);
 - Rails that are not bent and twisted;
 - Ferrous materials that do not contain frogs, switches and guard rails;
 - Rails that do not have split heads and broken flanges;
 - Pieces of CWR, provided no weld is over 9" from the end of the rail; or
 - As specified by the Institute of Scrap Recycling Industries.
- (d) Defective rails should be immediately removed from the right-of-way to the approved MassDOT secured scrap material storage area.

§113.4.2(M) New Rails

Class of Rail	Use
Medium-Hard Rail* Standard Rail (HB310)	In all tracks.
Head-Hardened Rail	For curves 3° and over, mainline turnouts, grade crossings, special trackwork, tunnels, and other locations as specified by the MassDOT Rail and Transit Division.
Notes: <ul style="list-style-type: none">* Standard Rail - standard rail that conforms to latest AREMA Specifications.* Head-Hardened Rail - prime rail that is fully quenched and tempered in the head area only to increase hardness and strength. Head-hardened rail rolled by PST (Bethlehem Steel Company) will be marked "HH" to the right of the heat number. Head-hardened rail rolled by Rocky Mountain Steel Mill (CF&I Company) will be marked "DH" to the right of the heat number.* Head-hardened markings furnished by any other manufacturers shall be approved by the MassDOT Rail and Transit Division.	

§113.4.3(M) Cropped or Relay Rails

- (a) Rails removed from track having only end defects, such as bolt hole cracks or head-web separations within joint bar areas, may be used without restrictions after defects have been eliminated by cropping (see §113.11(M)).
- (b) Relay rail should be checked against the rail wear table given in §113.2.1(M) prior to installation.
- (c) Any relay rail installed in main track that carries passenger trains, or is a hazardous material route, shall be inspected for internal rail defects if the operating speed is Class 3 or higher.
- (d) If a valid search for internal defects cannot be conducted before expiration of time or tonnage limits given in FRA §213.237(a) or (c), reduce operating speed to a maximum 25 MPH until such time as the valid search can be made.

§113.5(M) Disposition and Shipment of Rails

- (a) Rails released from renewals and retirements must be disposed of as authorized by MassDOT.
- (b) Other track materials (OTM) must be removed from the individual rails before loading rail onto railcars or trucks (see §100.3(M)).
- (c) For shipment, relay rails may be loaded head up with wood stripping between layers.

§113.6(M) Distributing Rail

- (a) Rails and OTMs should be unloaded in a position as close as possible for laying to minimize further handling.

- (b) Rails should be placed parallel with the track on their base to avoid excessive bending or damage. Care should be taken to avoid placing rails on manhole covers, on signal cables and conduits, or close to air lines.
- (c) Rail is not to be stored between the running rails unless conditions do not allow rail placement outside the track off the ends of the ties. Rail heads should not be above the running rail.
- (d) CWR ends must be offset and blocked to allow for thermal expansion.
- (e) In yards and at locations where employees must walk close to the track, rail should be placed as near to the ends of ties as possible to avoid obstructing walkways.
- (f) Any time rail and OTM is distributed along the right-of-way, the Transportation Department must be notified so as to include in a Division Notice.

§113.7(M) Preparation and Care

- (a) As far as practicable, track should be placed in good line and surface prior to rail renewals. Programmed tie renewal shall be accomplished before laying rail. Track to be laid with CWR should be fully ballasted, and preferably, programmed tie renewals should be completed in advance of rail laying.
- (b) Rails should be examined prior to laying in track to detect any sharp bends, damage, or surface conditions that will make them unserviceable.
- (c) Care of rail should be taken the day on which it is laid, so that no damage to rail or fastenings will result from continued use under normal traffic. Loose ties should be tamped to a good bearing under the rail immediately behind rail laying operations.

§113.8(M) Laying Jointed Rails

- (a) Jointed rails should be laid, one at a time, with space allowance for expansion being provided between rail ends in accordance with the following table:

Jointed Rail Expansion Tables	
39' Rails	
Rail Temperature (°F)	Rail End Space (Inches)
Below 6	5/16
6 to 25	1/4
26 to 45	3/16
46 to 65	1/8
66 to 85	1/16
Over 85	None

78' or 80' Rails	
Rail Temperature (°F)	Rail End Space (Inches)
Below 30	5/16
31 to 45	1/4
46 to 60	3/16
61 to 72	1/8
73 to 85	1/16
Over 85	None

- (b) Rails greater than 80' and less than 400' in length, must be expanded and anchored as CWR.
- (c) To insure the required space allowance, rail ends should be brought squarely together against approved expansion shims of proper thickness and the rail joints applied before spiking and anchoring.
- (d) Space between rail ends for insulating joints (paper and poly types) should only be sufficient to permit insertion of standard end posts.
- (e) An approved rail thermometer shall be used. The person in charge shall see that rail temperature is checked frequently and that proper rail expansion shims are used.
- (f) Jointed rails should be laid, one at a time, with space allowance for expansion being provided between rail ends.
- (g) To insure the space allowance required, rail ends should be brought squarely together against approved expansion shims of proper thickness and the rail joints bolted before spiking.
- (h) An exception to the requirement of laying one rail at a time is to expedite rail installation no more than 180' of rail (5 @ 39' rails) may be bolted together prior to being installed in track, provided that the proper rail end spaces are maintained according to §113.9(a) above.
- (i) Space between rail ends in insulated joints should only be sufficient to permit installation of standard end posts.
- (j) An approved magnetic rail thermometer shall be used to determine the rail temperature. The thermometer is to be attached to the web of the rail that is shaded from the sun's rays for a minimum of 5 minutes until an accurate temperature reading can be achieved. Rail thermometer should be placed on the smooth surface of the web and not on any raised brand.
- (k) Rail should be laid with joints staggered 13' to 15'. Permissible variations are as follows:
 - (1) Through turnouts and at insulated joints;
 - (2) Rails laid with the joints of one line of rail opposite the middle of rails in the other line in accordance with former standards need not be relocated until out-of-face rail renewals are made; and
 - (3) At other locations as directed by the MassDOT Rail and Transit Division.
- (l) Rails less than 18' in length should not be used in main tracks, except that rails not less than 14' may be used for:
 - (1) Connections within turnouts and crossovers;
 - (2) Temporary closures;
 - (3) Temporary replacement of broken rails. Rails not less than 14' in length used in accordance with previous standard practice need not be removed until rails are changed or re-laid.
- (m) Placing bolted joints in or closer than 30' from the edges of road crossings, within the limits of switch rails, frog guard rails, or the ends of open deck bridges, trestles, or viaducts is prohibited (unless approved by MassDOT Rail and Transit Division).
- (n) Rails of the same section should be used on open deck bridges, through road crossings, through paved track areas of station platforms, through areas of direct fixation track, and to the greatest extent possible in turnouts and crossovers.
- (o) Rails of unequal wear and different sections must be brought to an even surface at joints on the tread and gage side of the rail by welding. When shimming is required to run off the difference in height of rails, the requirements of §129.0(M) must be met.

- (p) The use of shims or spring washers between the web and the joint bar to align the gage sides of rail heads, or the use of acetylene torches, or grinding to manufacture, or change the dimensions of compromise joints, is prohibited. Adjustments to the tread and gage side of the rail head must be accomplished by:
 - (1) Compromise joints of approved design.
 - (2) By welding the rail head.
- (q) When necessary to make a temporary connection for the passage of a train at normal speed, the connection must be made with a piece of rail not less than 14' long. Use compromise or standard joints with the full number of bolts and with all rail holding spikes driven. Use of switch points to make temporary connections when laying rail is prohibited.

§113.9(M) Rail End Bolt Holes

- (a) Holes must be drilled in accordance with AREMA recommended standard practice and the following:
 - (1) Bolt holes shall be drilled with the joint bars removed by marking the location of the center of the hole with a proper size template block or by drilling through an approved template.
 - (2) When bolt holes are drilled, a uniform feeding pressure should be maintained as per manufacturer's instructions.
 - (3) An environmentally sensitive lubricant should be used throughout the drilling process.
 - (4) Bolt hole sizes and drillings are found in the rail end drilling table given in §113.1(M).
 - (5) After drilling is completed, bolt holes should be brushed out and inspected. Any burrs or chipped edges should be removed by chamfering or filing to a smooth edge around the entire circumference of the bolt hole.
 - (6) If jointed rail is to be welded, rail ends should be drilled in such a manner as to provide for closure by field welding (no edge of hole closer than 6" to the joint).
 - (7) In those instances where the joint will not be welded, all holes in the joint bar will be drilled and fully bolted.

§113.10(M) Cutting and Electric Arc Welding of Rail

- (a) For cutting of tight rails in CWR see Appendix A, "Continuous Welded Rail (CWR) Procedures."
- (b) The tools which may be used for cutting rails are listed below:
 - (1) Power saws with approved guide attachments and proper PPE.
 - (2) Gas cutting torches, in emergency only in accordance with FRA §213.122.
- (c) Electric arc welding is prohibited on any portion of the rail, except as listed below:
 - (1) Welding of engine burns. Engine burns deeper than 3/8" should not be welded. If there are more than four engine burns within a 39' rail, the rail should be changed out.
 - (2) Application of welded bonds.
 - (3) Top of rail within limits of joint bars (batter and rail ends).
 - (4) Gas welding of rail is prohibited.
- (d) Any rail damaged by torches must be promptly removed from track.
- (e) Except for the welding of engine burns in accordance with approved methods, and except for application of welded bonds, gas or electric arc welding is permitted only on the top of the rail within the limits of the joint bars.

§113.11(M) Bonding Rails for Track Circuits

- (a) Except in an emergency where rails are bonded for track circuits, no rail bonds shall be broken or rails removed unless a Signal Maintainer is notified or present.
- (b) Signal bonds shall not be applied to the rail web or base; only on the rail head.
- (c) In an emergency, a broken rail, switch point, or frog may be renewed without waiting for the Signal Maintainer. In such cases, the joints shall be tightened to make as good contact as possible with the rails and the Signal Maintainer notified that the rail bonds have been broken.
- (d) If a broken rail is replaced within the starting circuit of automatic highway crossing protection, the track shall not be restored to service until all trains approaching the crossing have been:
 - (1) Instructed to be prepared to stop prior to passing over the crossing involved; or
 - (2) Until a qualified person under FRA §213.7(d)(1) is provided to move train traffic at the crossing; or
 - (3) The Signal Maintainer has applied all rail bonds and verified the continuity of the circuit.

§113.12(M) Maintenance of Rail by Grinding

- (a) Rail grinding must be accomplished with profile grinders or production grinding units.
 - (1) Hand grinding should be limited to small areas where the use of profile grinders is not practical.
 - (2) Out-of-face grinding must be performed with production grinding units.
- (b) Production grinding is required to remove surface anomalies such as scale, flakes, checks, shells, and corrugations on the rail head and to re-profile the rail head.
- (c) In special trackwork a combination of production grinding and hand grinding may be required.
- (d) Grinding of rail should be performed at regular intervals based on the condition of the rail, location (such as grades and curves), the number, and type of trains, and the accumulated tonnage at a particular location.
- (e) All grinding on wooden open deck bridges shall be approved by MassDOT Rail and Transit Division before any work begins. Rail grinding on bridges (ballast deck) is permitted provided that proper precaution is taken against fire as given below:
 - (1) Grinding shall only be performed when there is no highway or river traffic directly under the area to be ground.
 - (2) The rail grinding crew has a supply of water and other fire suppressants to protect against fire.
 - (3) After grinding, the entire structure is re-inspected for possible “hot spots” or fire.
 - (4) Production grinding of rail on timber trestles is prohibited.
- (f) High rail truck with water tank shall follow rail grinder to inspect for hot spots and slag.
- (g) MassDOT Rail and Transit Division shall approve lubricants and/or friction modifiers to be used after grinding curves on:
 - (1) Gage face on the high rail
 - (2) Top of rail (TOR) on the low rail.

§113.13(M) Repair of Welds and Rail Head Depressions by Welding or Grinding

- (a) Field and shop welds shall be inspected for batter. Maintenance welding and grinding shall be performed as required.
- (b) The depth of low spots and depressions around welds shall be measured with a 36" straight edge and taper gauge. Maintenance welding and grinding shall be performed as required.
- (c) The preferred method of removing low spots, low areas, and engine burns (but NOT engine burn fractures), in the rail head profile is by building up the rail head by welding.
- (d) Any engine burn should be repaired as soon as practicable before rail and tie damage occur. Engine burns 3/8" or greater require removal and replacement of the rail.

§113.13.1(M) Cross Cutting (Slotting) of Bolted Joints

- (a) Permanent bolted joints shall be inspected and rail ends slotted as required to remove metal flow and prevent end chipping.
- (b) When rails are replaced at the location of a permanently bolted joint, the rail ends should be slotted.
- (c) The frequency of grinding or slotting rail ends at permanently bolted joint locations may increase due to traffic and as other local conditions require.

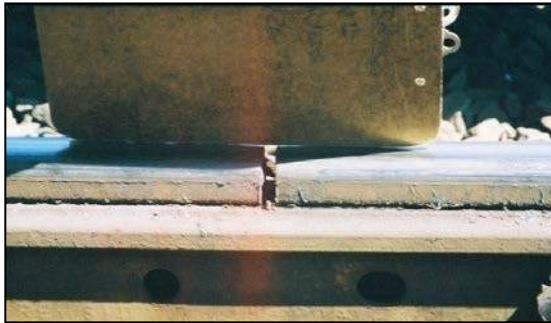
§113.14(M) Passing Trains Over Broken Rails and/or Pull-Aparts

- (a) When passing trains and/or locomotives over broken rails and/or pull-aparts, the Operating Railroad Company MOW personnel shall comply with the following information.
- (b) Persons not fully qualified to supervise certain renewals and inspect track as required in Paragraph (a) of this section, but with at least one year of MOW or signal experience, may pass trains over broken rails and pull-aparts provided that:
 - (1) The track owner determines the person to be qualified and, as part of doing so, trains, examines, and re-examines the person periodically within two years after each prior examination on the following topics as they relate to the safe passage of trains over broken rails or pull-aparts: rail defect identification, crosstie condition, track surface and alignment, gage restraint, rail end mismatch, joint bars, and maximum distance between rail ends over which trains may be allowed to pass. The sole purpose of the examination is to ascertain the person's ability to effectively apply these requirements and the examination may not be used to disqualify the person from other duties. A minimum of four hours training is required for initial training;
 - (2) The person deems it safe and train speeds are limited to a maximum of 10 MPH over the broken rail or pull apart;
 - (3) The person shall watch all movements over the broken rail or pull apart and be prepared to stop the train if necessary; and
 - (4) Person(s) fully qualified under FRA §213.7 are notified and dispatched to the location promptly for the purpose of authorizing movements and effecting temporary or permanent repairs.

§115.0(M) RAIL END MISMATCH

Rail shall be maintained so that the mismatch of rails at joints may not be more than that prescribed in the following table:

Rail End Mismatch Maintenance Limits		
Class of Track	Any mismatch of rails at joints may not be more than the following:	
	On the head of the rail ends (Inches)	On the gage side of the rail ends (Inches)
1 – 5	1/8	1/8



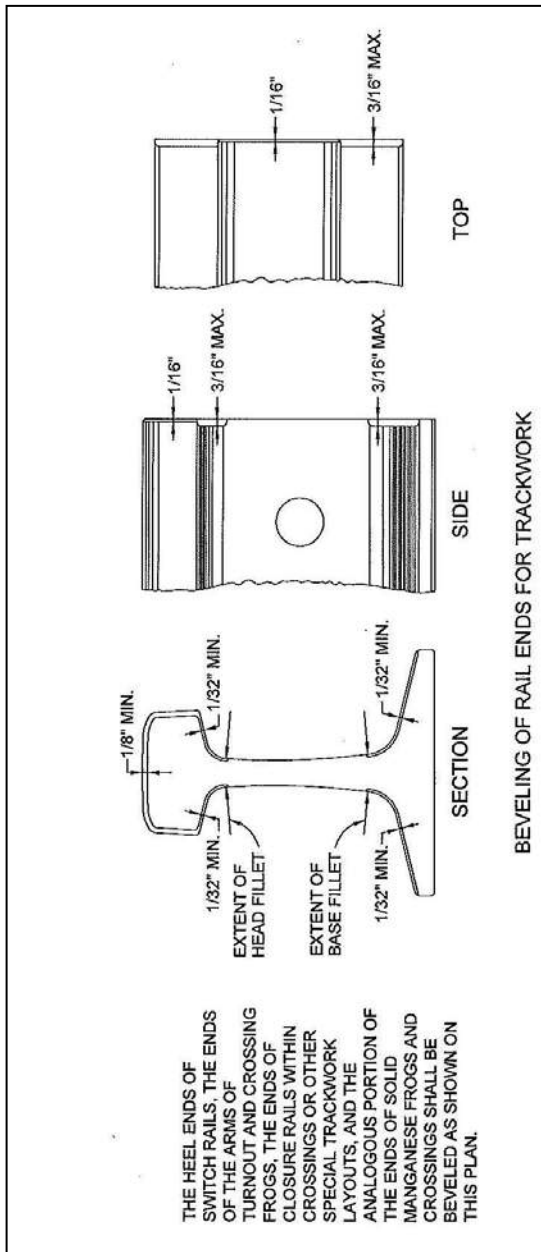
Rail End Mismatch

§117.0(M) RAIL END BATTER/BEVELING OF RAIL ENDS

- (a) Rail end batter is the depth of depression in the rail head near the end of the rail. It is measured by placing an 18" straight edge on the head of the rail at the rail end, without bridging the joint and measuring with a taper gauge the maximum distance between the bottom of the straight edge and the top of the rail head.
- (b) When rail end batter is detected, it should be monitored and corrected when reaching the limits given below:
 - (1) See the following table:

Rail End Batter Maintenance Limits		
Class of Track	Rail End Batter May Not Be More Than (Inches):	Crop Bolt Holes and Rail Ends to Remove Batter if Batter Exceeds Values Below (Inches):
1 - 2	1/4	3/8
3 – 5	1/8	1/4

- (2) Rail end batter should be repaired by a qualified welder using an electric arc welder.
- (3) In Classes 3-5, rail ends that have 3/8" or more rail batter shall not be welded and shall be cut out and scrapped.
- (4) After welding, rail ends shall be ground and slotted as shown in Paragraph (c).
- (c) To reduce chipping or spalling due to overflow of steel under traffic, the rail end faces should be cross-cut by grinding with a 1/8" beveled slotting wheel to a depth of not less than 3/16" below the surface of the head.
 - (1) The maximum cut should not be wider than 1/8".
 - (2) If the rails are not in contact, the overflowed metal should be removed from both end faces by grinding 1/16" from the ends of both rails.
 - (3) See following figure as developed by AREMA.



§118.0(M) RAIL LUBRICATION

- (a) The gage face of the running rail in track or in special trackwork must be lubricated as follows:
 - (1) Running rail in curve locations where there is significant gage face wear on the high rail, or significant flow on the low rail, shall be lubricated with a wayside lubricator or as specified by the MassDOT Rail and Transit Division.
 - (i) Lubricate high rail gage face
 - (ii) Lubricate low rail top of rail
 - (2) When changing switch points, stock rails, and frogs in heavily used routes in interlockings, regardless of turnout size or type, lubricate new components by hand.
 - (3) After grinding or welding repairs to switch points and/or frogs, lubricate components by hand.
 - (4) When production grinding, ensure that in curves both rails are lubricated on the last grinding pass.
- (b) When lubricating rail, care should be taken to control the amount of lubricant being used to avoid migration to the running surface of the rail.
- (c) At wayside lubricator locations, install geotech fabric to prevent fouling of ballast. Dispose of fabric in accordance with local, State, and Federal regulations.
- (d) Locate lubricators no closer than 500' from grade crossings with active warning devices.
- (e) When installing lubricators, care should be taken not to install steel-mesh hoses in signal territory.
- (f) Both rails should be lubricated as excessive lubrication of the high rail and poor lubrication of the low rail can produce high lateral forces and low rail rollover resulting in derailment.
- (g) Use only approved environmentally-friendly lubricants per manufacturer's recommendations.

§119.0(M) CONTINUOUS WELDED RAIL PROCEDURES

See Appendix A, "Continuous Welded Rail (CWR) Procedures."

§121.0(M) RAIL JOINTS

§121.1(M) *Field Welding of Rail Joints*

- (a) When performing rail maintenance, reduce the quantity of joints in track by laying CWR and field welding joints wherever possible.
- (b) Thermitite and flash butt are acceptable methods for in-track field welding.
- (c) Thermitite and flash butt welding shall be performed in accordance with the supplier's recommended procedure.
- (d) When it is necessary to install plug rails, the plug rails should be at least 13' in length.
- (e) Bonded insulated joint rail assemblies shall be field welded.
- (f) Whenever possible it is desirable to field weld all turnouts and special trackwork.
- (g) If it becomes necessary to apply temporary joint bars in CWR, the end bolt hole in each rail must not be drilled, as this would prevent subsequent field welding. Additional rail anchors must be applied to this joint in accordance with §125.0(M).

- (h) Field welding on open deck bridges is permitted provided that proper precaution against fire is taken and only allowed with the prior approval of MassDOT Rail and Transit Division.

§121.1.1(M) Thermite Field Welding

- (a) When using the thermite field welding process:
- (1) Ensure that rail ends are secured against movement from thermal expansion or contraction, or from other causes. Use a hydraulic expander to maintain the rail end gap and rail alignment.
 - (2) Saw cut rail ends to be welded. If a torch cut rail is to be welded at least 2" of rail behind the torch cut must be cut off with a saw before the weld is made.
 - (3) No thermite weld shall be made:
 - (i) If the air temperature is below 32°F.
 - (ii) In inclement weather (rain or snow).
 - (4) Required location of field welds:
 - (i) Within 14' of a field weld in the same rail.
 - (ii) Within 4' of a plant weld in the same rail.
 - (iii) Within 10' of the centerline of any joint (except bonded insulated joints where no weld shall be made within 7' of the centerline of the joint).
 - (iv) Within 6" of a bolt hole.
 - (v) Within 6" of a weld that has been cut out.
 - (vi) On or within 4-1/2" of a tie plate or concrete tie rail seat.
 - (vii) Within a grade crossing without the permission of MassDOT Rail and Transit Division.
 - (5) General welding procedures are as follows:
 - (i) Prior to installing the molds, make a visual inspection of the two rail ends to ensure there are no bent rails or other defects such as cracks, splits, pipes, etc., which could cause, or later be interpreted as a defective weld.
 - (ii) Check the gap to ensure that it meets the specification of the weld kit manufacturer.
 - (iii) Align the rail ends.
 - (iv) Remove foreign matter, luting compound, and/or moisture from the molds or crucible.
 - (v) If a hydraulic expander has been used, do not release it until the weld has cooled to 500°F or less. The expander shall be released gradually.
 - (vi) No train traffic shall be allowed to pass over the weld, nor shall there be any disturbance of the track or rail in the area of the weld, until the weld has cooled to 500°F or less.
 - (6) The grinding and finishing of the weldment are as follows:
 - (i) The top and sides of the head of the rail at the weld shall be ground flush with the parent metal.
 - (ii) The weld in the web and base should be ground **only** to remove notches created by offset conditions, sharp protrusions, and gouges. These should be blended into the contour of the weld collar to eliminate stress risers.
 - (iii) In the case of continuously supported rail, the bottom and sides of the base must be ground flush with the parent metal.

- (iv) Overheating the rail when grinding must be avoided. If a weld has cooled to below 500°F it must be ground so as to not increase the temperature back above 500°F.
 - (v) Finish grinding shall be conducted when the weld temperature is less than 200°F.
- (7) Welds shall be identified on the rail with a unique number and the date using a highly visible paint or paint stick to allow identification of a particular weld.
- (8) Welds shall be inspected once completed and ground.
 - (i) A visual inspection shall be conducted immediately. This inspection shall look for voids, nicks, gouges, sharp protrusions, or other obvious surface defects.
 - (ii) An inspection of the alignment of the weld shall be conducted using a 36" straight edge centered on the weld. The weld will meet the following criteria:
 - 1. There shall be no dip.
 - 2. The crown shall not measure more than 3/50" at a point 18" from the weld.
 - 3. The horizontal misalignment (measured by placing the straight edge on the running side of the head) shall not measure more than 3/50" at a point 18" from the weld or at the weld if the misalignment causes a gap at the weld.
- (9) An ultrasonic inspection of the weld shall be conducted within 24 hours of the completion of the weld.
- (b) Field welding on open deck bridges is permitted provided that all the following conditions are met:
 - (1) A qualified contractor and/or Operating Railroad Company individual using a 17 lb. dry chemical ABC extinguisher is available to protect against fires.
 - (2) A qualified contractor and/or Operating Railroad Company individual must be present for a period of at least one hour after the last field weld is finished and ground.
 - (3) An extra 17 lb. ABC extinguisher must also be readily accessible as a backup.
 - (4) While extinguishing any fires, the qualified contractor and/or Operating Railroad Company individual must stand upwind and aim the chemical at the base of the fire.
 - (5) A qualified contractor and/or Operating Railroad Company individual must be present during the entire welding operation from beginning of welding process to at least one hour after the last field is finished and ground.
 - (6) Flash butt welding, shearing and grinding shall only be performed when there is no highway or river traffic directly under the area of the welding.
 - (7) Bridge timber spacing may be more restrictive than that of ballasted track. Welding shall not be performed if the tie crib is less than 5-1/2" in width or as approved by MassDOT Rail and Transit Division.
 - (8) Welds on open deck bridges must be made as close to the center of the crib as possible. The minimum distance between center of weld and edge of tie shall be 2-3/4".

- (9) After welding, the entire structure should be inspected for possible “hot spots” or fire.

§121.1.2(M) Electric Flash Butt Welding

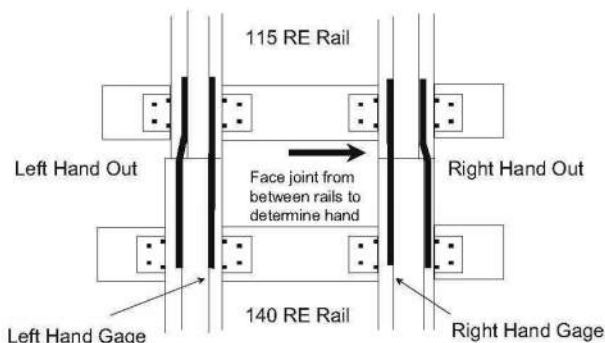
- (a) In general, thermite field requirements apply to this process along with the following additions:
 - (1) All electric flash butt welding consumes rail (1-1/4" – 1-1/2" at each weld location).
 - (2) The weld must be at least 400' from grade crossings, turnouts or other fixed objects in the track.
 - (3) Anchors or resilient fasteners must be removed from at least 200' of rail on both sides of the weld before the weld is made.
 - (4) Care must be taken to avoid skewing ties by binding the rail against the shoulder of the tie plates when the rails are pulled together.
 - (5) Care must be taken to avoid damaging elastomeric tie pads by sliding the rail through the tie seat area of concrete ties when the rails are pulled together.
 - (6) If new rail is to be welded by the electric flash butt welding method, this decision should be made before the rail is laid and distressed so that the right amount of expansion can be calculated.
 - (7) When CWR strings in track are laid in track and expanded to reach a preferred rail neutral temperature (PRNT), the actual required expansion shall be reduced if the CWR strings are to be electric flash butt field welded. The amount of expansion required for a particular CWR string shall be calculated using Appendix A, “Continuous Welded Rail (CWR) Procedures.” The amount of rail to be consumed when making the two electric flash butt field welds at each end of the string shall be subtracted from the amount calculated in Appendix A, “Continuous Welded Rail (CWR) Procedures.” The resulting “net” rail expansion shall be achieved in the field when distressing and/or laying the string before welding.

§121.2(M) Bolted Rail Joints

- (a) Rail ends shall be fastened together by bolted standard, compromise, or insulated joints.
- (b) The use of shims or spring washers between the web of the rail and the joint bar to align the gage sides of rail heads is prohibited.
- (c) The use of acetylene torches or grinding to reconfigure or change the dimensions of standard and/or compromise joint bars is prohibited.
- (d) Compromise joint bars of an approved design shall only be used to join rails of the respective sections.
- (e) If rail end mismatch exists after applying approved joint bars, the rail head and gage face surfaces may be adjusted by electric arc welding the smaller rail and grinding to finish the weld. Do not grind the larger rail section.
- (f) Each rail joint, insulated joint, and compromise joint must be of a structurally sound design and dimensions for the rail on which it is applied.
- (g) If a joint bar is cracked, broken, or because of wear allows excessive vertical movement of either rail when all bolts are tight, the joint bar shall be changed.
- (h) Each joint bar must be held in position by track bolts tightened sufficiently to provide firm support for abutting rail ends and to allow longitudinal movement of rails in the joint to accommodate expansion and contraction due to temperature variations.

- (i) In track with conventional jointed rail, each rail shall be bolted with all joint bar bolt holes filled.
- (j) If a permanent joint connection is made between CWR and bolted rail, all joint bar holes must be filled.
- (k) No rail or joint bar having a torch cut or burned bolt hole may be used in track.
- (l) When a bolt is changed in a joint in Track Classes 1-5, or a frog bolt is changed, then all bolts in the connections shall be checked and retightened as required.
- (m) Whenever possible, new bolts, nuts, and spring washers should be used when new or relay joint bars are applied.
- (n) Lubricate joint bars with environmentally-approved lubricate. Tighten all bolts, working from center of joint bars outward. During this final tightening, tap the toes of the bars inward with a sledgehammer.
- (o) In locations of elastic fasteners, the appropriate clip will be used to properly fasten the ties through the joint area.
- (p) Description of joint bars:
 - (1) Standard bolted rail joints consist of either head free or head contact standard bars or compromise joint bars held in position by track bolts having sufficient tension to firmly support abutting rail ends, but not too tight to prevent longitudinal movement in joints to accommodate expansion and contraction due to variation in rail temperature.
 - (2) Head free bars must have the inner surface of the head of the bar held tightly against the rail head fillet with the heel of the bar standing out the proper distance from the base fillet, where all of the "draw-in" for wear is concentrated.
 - (3) Head contact bars must have the top surface of the bar held tightly against the fishing surface under the rail head outside of the rail head fillet area. Bars must be secured in a vertical position without "cocking."
- (q) Application of standard bolted joint bars will be as follows:
 - (1) Joint bars shall be applied with their full number of bolts, nuts, and spring washers according to the standard plans and specifications.
 - (2) New bolts, nuts, and spring washers should be used when new or reformed joint bars are applied or renewed out-of-face.
 - (3) Grease shall be applied to the fishing area of the rails, for the full length of the joint bars.
 - (4) When initially applying joint bars, the bolt tension should be brought in the range of 20,000 to 25,000 lbs. and for subsequent retightening from 15,000 to 20,000 lbs. This may be approximated by an average individual with a 36" track wrench.
- (r) Application of head free joint bars will be as follows:
 - (1) Set bars in position, insert all bolts, and apply spring washers and nuts by hand.
 - (2) Tighten up the two center nuts with a power track wrench in high gear without fully tightening to avoid locking bars in an improper position.
 - (3) Strike the bead of the heads of both inside and outside bars at both ends with a hammer to force the inside faces of the bars tightly against rail head fillets. Do not strike the toe of the bar, as this tends to force the toe of the bar outward.
 - (4) Tighten remainder of bolts from center of joint bars outward in high gear.

- (5) Tighten all bolts in low gear, working from center of joint bars outward. During this final tightening drive the toes of the bars inward by tapping with a spike maul or sledge.
- (6) By following the above procedure, proper contact will be obtained between the inner face of the bar and the rail head fillet. Also, the heel of the bar will stand out the proper distance from the rail base fillet.
- (s) Application of head contact joint bars will be as follows:
 - (1) Set bars in position on rail; insert all the bolts, nuts, and spring washers by hand.
 - (2) See that the bars are in a vertical (uncocked) position as one of the center bolts is tightened by:
 - (i) Inserting a bar or drift pin in a bolt hole (necessary only when applying a 131 lb. bar).
 - (ii) Tapping toes of joint bars as bolt is tightened.
 - (3) Tighten all bolts, working from center of joint bars outward. During this final tightening drive the toes of the bars inward by tapping with a spike maul or sledge so that their vertical position is maintained.
- (t) Maintenance of joints:
 - (1) Drilled ends of new rails are to be ground to remove burrs at the mills.
 - (2) To avoid chipping or spalling under service due to overflow of steel, the rail end faces should be cross-cut by grinding with 1/8" wheel to a depth of not less than 3/16" below the surface of the head. If the rails are not in contact, the overflowed metal should be removed from the end face of each rail. If the rails are in contact, only one pass should be made removing approximately 1/16" from each rail.
 - (3) When bolted joints are applied, other than insulated joints, the bolts should be tightened at the time they are applied, retightened within a week and again within a month after application.
 - (4) Bolts should be retightened periodically at intervals of not more than 1 year and in all cases following program track raising or surfacing.
 - (5) To prevent undue rail stress on account of expansion or contraction at the changes of seasons and wide temperature changes, sufficient joint bars should be loosened to permit the rail to adjust itself, immediately after which bolts should be retightened. Where necessary, a piece of rail should be cut out to avoid heat kinks or buckling of track.
 - (6) Wear in fishing spaces of rail should be compensated for by the application of oversized joint bars.
- (u) Compromise joints are specified as left or right hand as shown in the following diagram. To determine where a left hand ("LH") or right hand ("RH") lays, stand in the center of the track and face the joint to be compromised.



Compromise Joint Example

§121.3(M) Insulated Rail Joints

- (a) For new work or rail renewals in track circuit territory, insulated joints shall be located as follows:
 - (1) Insulated joints shall be staggered not more than 60" nor less than 24".
 - (2) Insulated rail joints at highway grade crossings shall be located in accordance with the material supplier's standard plans.
- (b) For the application of Bonded Insulated Joints (Glued Insulated Joints), see the following:
 - (1) Glued plug insulated joints are required on all concrete tie tracks.
 - (2) When utilizing insulated plug rails, install the shortest plug rail available so as to minimize the number of joints and/or wells added.
 - (3) Conventional rail joints adjacent to bonded insulated joint rails should be field welded.
 - (4) All bonded insulated joints are to be installed as suspended joints. If it is absolutely necessary to install the insulated joint as a supported joint on a wood crosstie, an approved type rubber tie plate must be used under the joint. The end posts should not project above or beyond rail heads and should be trimmed with a hack saw.
 - (5) Double shoulder tie plates or elastic fastener tie plates should be used on the two wood crossties supporting suspended bonded insulating joints.
 - (6) Rail holding spike heads must be in reverse position and must be carefully driven to ensure that spike head is not in contact with the bar, which could result in the joint's being short circuited. All bonded insulating joints will have plate holding spikes installed.
 - (7) Joints installed with elastic fasteners shall have the correct clips (modified "e" clip) applied to prevent possible damage to the joint.
 - (8) No attempt should be made to tighten bolts in bonded insulated joints. In the event the bolts in the joint become loose, the joint should be replaced.

- (9) Any rail head overflow at a bonded insulated joint is to be removed by grinding. Extreme care must be exercised to ensure that the end post is not damaged. The overflow should be ground only to the rail end, so that the joint gap will not be greater than the original gap. A cross grinder/slotter should not be used to remove the overflow.
- (10) Bonded insulated joints will be considered as welded rail for purposes of compliance with the anchoring requirements of §125.1(M).
- (11) Glued plug insulated joints shall be used in CWR (unless approved by MassDOT Rail and Transit Division).
- (c) For the application of Polyurethane Coated Steel Insulated Joints (Poly Joints) see the following:
 - (1) Polyurethane coated (poly) steel insulated joints may be used permanently in track where the use of a bonded insulated jointed rail is not practical.
 - (2) Whenever possible, poly insulated joints are to be installed as suspended joints.
 - (3) The top of the poly joint must be set first into the fillet area of the rail. Bolts should be applied and tightened from the center out to the end of the bar.
 - (4) Rail holding spikes shall be reversed and not driven up against the poly joint.

§123.0(M) TIE PLATES

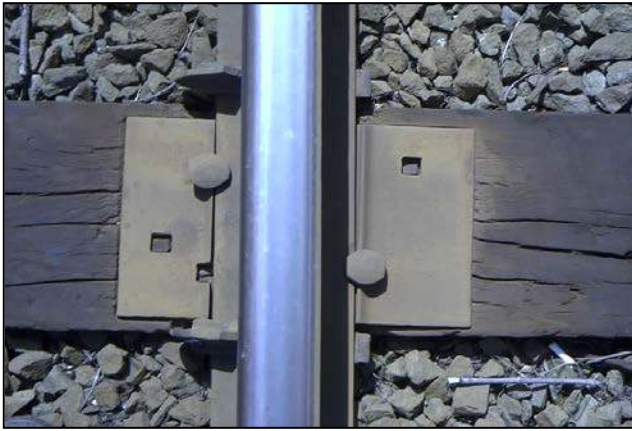
- (a) Tie plates shall be installed and centered under running rails on all wood cross ties, switch timber, and bridge timber.
- (b) The preferred tie plate is a 14" double shoulder canted (1:40) plate (DSC).
- (c) Tie plates with different cants and flat plates shall not be mixed.
- (d) Canted tie plates shall be installed so that the rail cants towards the centerline of track.
- (e) Tie plates must be placed square and tight to the base of the rail and no portion or part of the shoulder can be under the base of the rail.
- (f) No metal object that causes a concentrated load by solely supporting a rail shall be allowed between the base of the rail and the bearing surface of the tie plate (e.g., tie plate shoulders, spikes, ballast, etc.).



Tie Plate with Anchors Applied Correctly



Tie Plate with Anchors Overdriven



Box Anchored Ties with Anchors Applied Correctly

§124.0(M) TIE PADS

The use of tie pads, under the tie plates on open deck bridges, may be used only with the approval of the MassDOT Rail and Transit Division.

§125.0(M) RAIL ANCHORS/ELASTIC FASTENERS

§125.1(M) Anchor Placement

- (a) Rail anchors shall be applied as follows:
 - (1) Anchors shall be applied on both rails and on the same side of the tie. Where special applications may be necessary, other arrangements may be used with permission of the MassDOT Rail and Transit Division.
 - (2) Wherever practicable, rail anchors shall be applied from the gage side of the rail.
 - (i) In turnouts, drive on type anchors shall be applied to switch stock rails from the field side of the track. Care must be taken in application of anchors so as not to foul switch rods.
 - (3) When adjusting or laying rail, the necessary anchor pattern shall be applied immediately as the rail is adjusted.
 - (4) Anchors should be fit tightly against sound ties.
 - (5) When ties at a joint cannot be anchored because of interference with a joint bar, there shall be no anchors applied to the affected joint.

§125.2(M) Fasteners Required

- (a) Rail anchors should be driven just far enough so that the locking lip or groove of the anchor snaps into place on the base of the rail.
- (b) A sufficient number of anchors must be applied in a pattern to effectively control longitudinal rail movement. See next pictures for typical fastening and anchoring systems.



Elastic Fastener: Pandrol Fast Clip



Elastic Fastener: Pandrol E-Clip

- (c) Insufficient anchors may result in longitudinal rail movement and allow changes in rail neutral temperature (RNT) in CWR.
- (d) The movement of rail can result in changes in line and surface, which may create a hazardous condition.
- (e) Additional anchors must be applied if there is a standard anchor pattern and there is evidence that rails are still moving longitudinally under traffic.
- (f) It should be recognized that when track is raised out-of-face, the resistance to longitudinal movement is reduced and additional anchors may be required to avoid undue rail and tie movement.
- (g) Basic anchor requirements in CWR track:
 - (1) Every other tie shall be box anchored in all CWR tracks.
 - (2) Box anchor every tie in curves 3° and over.
 - (3) Additional anchors may be added at designated locations in anchored track or elastic fastener territory as required if longitudinal movement of the rail is detected.
- (h) On main tracks the number of anchors to be applied when CWR is laid and maintained is as follows:
 - (1) When using rail anchors, box anchor every wood tie 200' in each direction from:
 - (i) Ends of CWR strings.
 - (ii) All joints to include glued plug insulated joints.
 - (iii) Turnouts, crossovers, and other special trackwork.
 - (iv) Rail track crossings.
 - (v) Public and private highway grade crossings.
 - (vi) Transitions to locations with elastic fasteners.
 - (vii) Transitions to locations of tie type change (e.g., wood to concrete or wood to steel).
 - (viii) Open decks on bridges, where the timbers are hooked and blocked in accordance with §119.1(M).
 - (2) To the extent practical, fully box anchor all ties in CWR within switch, turnout, and crossover areas.
- (i) Rail anchoring systems shall be used on open deck bridges, trestles, and viaducts as determined by the MassDOT Rail and Transit Division.
- (j) All jointed rail tracks require:
 - (1) A minimum of 40 anchors for a 78' rail and be boxed on 20 ties.
 - (2) A minimum of 16 anchors per 39' rail and be boxed on 8 ties.
 - (3) A minimum of 10 anchors per 33' rail and be boxed on 5 ties.
 - (4) No anchors will be placed in grade crossing panels (unless approved by MassDOT Rail and Transit Division).
- (k) A fully clipped wood tie, bridge timber, or fully clipped and insulated concrete tie with an elastic fastener, is considered equivalent to a box anchored wood tie.

§125.3(M) Anchor Maintenance

- (a) Ineffective anchors shall be removed and replaced when installing railing.
- (b) Rail anchors must have full bearing against the tie, or tie plate, when applied.

- (c) In order to avoid damage, only proper tools or machines should be used in applying and removing rail anchors.
- (d) Anchors should never be applied with a spiking hammer.
- (e) Anchors should not be driven along the base of the rail with a hammer.
- (f) Care should be taken not to strike the rail.
- (g) When the bearing of rail anchors against the tie is disturbed by renewing or re-spacing ties or replacing rail, or the anchor was not properly applied, the anchors must be taken off and then re-applied in proper position. All anchors removed must be re-applied, and defective or broken anchors must be replaced as necessary.
- (h) Proper opening between rail ends in jointed rail is maintained by the use of rail anchors.

§125.4(M) Anchor Use

New or relay rail anchors may be used at any location on the MassDOT system as long as they are designed for the rail section to which they are applied and perform as intended.

§127.0(M) RAIL FASTENING SYSTEMS

§127.1(M) Number Required

- (a) Track shall be fastened by a combination of components which effectively maintains gage to the prescribed limits.
- (b) Additional fasteners may be used where they are needed to hold gage and/or restrain the movement of rail (both longitudinal and lateral).

§127.2(M) Installation of Fasteners

§127.2.1(M) Elastic Fasteners/Clips

- (a) All elastic fasteners shall be inserted or removed from the specially designed tie plate with an approved device such as an 8 lb. sledgehammer. ***The use of a spike maul is prohibited.***
- (b) Elastic fasteners shall not be overdriven as overdriving will cause premature relaxation of the fastener.



Overdriven Pandrol E-Clip



Correctly Driven Pandrol E-Clip as End of Clip Lines Up with Edge of Tie Plate

- (c) If a fastener has been overdriven or is not performing its intended function of limiting the vertical and longitudinal movement of the rail, it shall be replaced.
- (d) In the case of an "e" clip, a distance of 3/8" (approximate width of a wooden pencil) between the shoulder and the face of the clip should be maintained. This clearance will prevent overdriving.
- (e) When applying clips with a sledgehammer, the clip must be gently tapped to ensure proper insertion before the clip is fully seated. When removing clips with a sledgehammer, secure clip with foot and gently tap clip to remove the toe load to ensure safe removal of the clip.
- (f) When installing clips, the tie must be tamped up flush with the base of the rail before driving the clip so as not to damage the clip. The clip is not to be used to pull the tie up to the base of the rail.

§127.2.2(M) Screw Spikes

- (a) A 15/16" diameter lag screw shall be used to secure elastic fastener plates with 1" diameter holes to wood ties and timber. Lag screws must be screwed into a 11/16" diameter pre-drilled hole that is 6" deep. Driving of lag screws with a sledgehammer or spike maul is prohibited.
- (b) As shown in the MBTA Standard Plan Book 1225, in turnouts, gage, slide, heel, frog and standard tie plates, all round holes will be filled with a screw spike except:
 - (1) Self-aligning frog tie plates shall have one screw spike installed on each end of each plate.
- (c) Holes for screw spikes shall be pre-drilled 11/16" in diameter and 6" deep.

§127.2.3(M) Cut Track Spikes

- (a) All spikes (cut spikes) shall be driven with the head pointed toward the rail, except that spikes driven against the sides of insulated joints shall be driven with the head pointing away from the rail and not be in contact with the joint bars.
- (b) Spikes should not be driven at ends of insulated joints as rail movement may cause the insulated joint bar to become electrically connected to the rail.
- (c) Spikes must be started vertically and squarely and driven straight. The shank of rail holding spikes must have full bearing against the base of rail. Spikes should be driven

in accordance with the AREMA Manual, Chapter 5, leaving 1/8" clearance between the spike head and the base of the rail. Do not overdrive spikes.

- (d) The use of lock spikes (hair pins) are prohibited. When existing lock spikes are removed they shall be replaced with cut spikes.
- (e) Care must be taken not to strike the rail, its fastenings, or signal appliances when driving spikes.
- (f) Spikes in main tracks, that have a cut throat, or are deteriorated due to rust, should be replaced.
- (g) All old spikes, when pulled, shall be picked up and scrapped.
- (h) Track spikes shall not be driven into round plate holes.
- (i) When the head of the track spike is broken off, the replacement spike should be inserted in a new location, leaving the spike stub in the tie.
- (j) All spike holes shall be plugged with cedar wood plugs, or with an approved plugging material, prior to re-spiking.

§127.3(M) Rail Fasteners Required

- (a) Track shall be fastened by a system of components that effectively maintains gage within the limits prescribed.
- (b) When spikes or elastic fasteners are used (unless otherwise ordered by the MassDOT Rail and Transit Division), each rail shall be fastened to every tie in the following manner:

Track	Rail Holding Spikes	Plate Holding Spikes or Lag Screws
Conventional Tie Plates		
Tangent and curves up to 1°	3 (1 field side rail holding; 2 gage side rail holding)	0
Curves between 1° and up to 4°	3 (1 field side rail holding; 2 gage side rail holding)	1 (1 field side)
Curves 4° and over and curved leads on all turnouts and crossovers	3 (1 field side rail holding; 2 gage side rail holding)	2 (1 field side; 1 gage side) ⁽¹⁾
Elastic Fastener Tie Plates	Elastic Fasteners (Clips)	Lag Screws
Tangent	2 clips	2 (1 field side; 1 gage side) ⁽¹⁾ (2 cut spikes – 1 in each square hole field and gage)
All Curves	2 clips	4 (2 field side; 2 gage side) (2 cut spikes – 1 in each square hole field and gage)
All track with pre-plated ties	2 clips	4 (2 field side; 2 gage side)
Note: ⁽¹⁾ Apply diagonally on opposite side of clip.		

§129.0(M) TRACK SHIMS

- (a) If track does not meet the geometric limits (e.g., crosslevel or profile), track shims may be installed to temporarily correct the track surface.
- (b) Shimmed track must be watched carefully to ensure that shims are in place and tight, and that proper gage and crosslevel is being maintained.
- (c) If shims are used, they must be removed as soon as the weather, or other conditions, permit the track to be surfaced.
- (d) Tie plates must not be removed from the ties as a means of adjusting the surface or crosslevel of track.
- (e) Track shims must be at least the size of the tie plate and be spiked directly to the tie with spikes which penetrate the tie at least 4-1/2".
- (f) Track shims must be bored where spikes are to be driven, and made of a material approved by MassDOT Rail and Transit Division.
- (g) Track shims shall be braced if the shim is over 1" in thickness.
- (h) Design and materials used in braces shall be approved by MassDOT Rail and Transit Division.

§145.0(M) BRIDGE GUARD RAILS

§145.1(M) Location

- (a) A bridge guard rail is a continuous line of rails, connected by bolted joints or welds. The guard rail is fastened to the crossties or bridge ties adjacent to the gage side of the running rail.
 - (1) One such rail is designated in these instructions as a "Single" bridge guard rail.
 - (2) Two such continuous lines of rail, one adjacent to the gage side of each running rail is designated as a "Full" bridge guard rail.
- (b) Guard rails are applied between the running rails of tracks at undergrade bridges which meet the below listed criteria. Full bridge guard rails shall be installed at the following locations:
 - (1) Open deck bridges.
 - (2) Ballast deck bridges.
 - (3) Truss bridges (all).
 - (4) Moveable bridges (all).
 - (5) Other locations as directed by MassDOT Rail and Transit Division.
- (c) Existing bridge guard rails applied in accordance to previous standards or practices need not be changed (unless instructed by MassDOT Rail and Transit Division).
- (d) When it is necessary to remove bridge guard rail to perform work, bridge guard rail will be reinstalled only where required by the above instruction.

§145.2(M) Materials

- (a) Suitable scrap or relay running rail may be used. The installed rail section will be approximately:
 - (1) Level, but not more than 3/4" below the top of the adjacent running rails as per MBTA Standard Plan Nos. 3060 and 3062.
 - (2) But in no case higher than the running rail.
- (b) Install tie plates under guard rails on every other tie or timber. Tie plates should be installed with reverse cant.

- (c) Joints shall be either four or six hole bars with a minimum of four bolts per joint. Joint bars shall not be used within the curved end section of the guard rail.

§145.3(M) Application

- (a) Bridge guard rails shall extend a minimum distance of 39' (for speeds up to 60 MPH) and 78' (for speeds over 60 MPH), beyond each end of the bridge abutment, unless increased distances have been prescribed for specific territories or locations.
- (b) The end of the bridge guard rails should be curved and brought to the center of the track.
- (c) Guard rail ends shall have the rail ends beveled, bent down, or be fitted with a bridge guard rail nose. Each end shall be fastened to the center of the track so as to divert a derailed wheel and not catch dragging equipment.
- (d) The guarding face of bridge guard rails on open deck bridges shall be parallel to and 12-5/8" from the gage of the running rail. If plates and clips are used on open deck bridges, see Paragraph (e) below.
- (e) The distance of the guarding face will be changed in the following locations:
 - (1) On ballasted deck bridges the guarding face shall be at 18".
 - (2) On ballasted approaches to bridges the guarding face shall be at 18".
- (f) Guard rail ends shall rest on a sound tie and be securely fastened.

§145.4(M) Inspection and Maintenance

Guard rails shall be inspected periodically to make certain that bolts and joints are tight, spikes are firmly against base of the rail, and castings fastened securely to rail ends, or ends properly beveled or bent down.

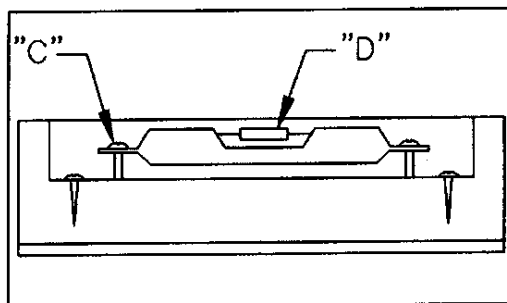
Subpart E - Tools

§150.0(M) TOOL REQUIREMENTS

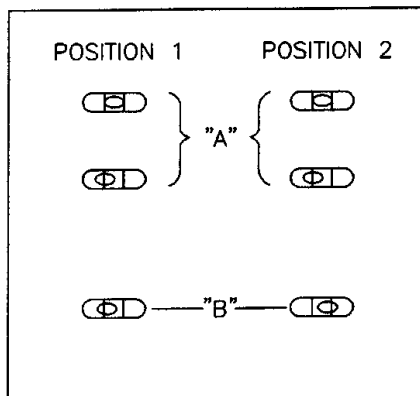
- (a) The person who is responsible for performing the track/switch inspection shall plan ahead and coordinate with the Operating Railroad Company to ensure that inspection tools are available when the inspection is made.
- (b) The person who is responsible to perform track inspections shall notify the Operating Railroad Company when tools become in disrepair so that a tool can be fixed or replaced.
- (c) Specified numerical limits given in this Part are to be confirmed during the track/switch inspection with the appropriate tool.
 - (1) Values are not to be estimated or approximated.
 - (2) Only values measured with approved tools are to be recorded on the Track Inspection Form.
- (d) The person who is responsible for performing track inspections is encouraged to make periodic recommendations for improvements in existing tools or gauges and changes in tools that are needed to make the required inspection measurements.

§150.1(M) Inspection Tools

- (a) Marking materials, as noted below, may be used to mark stations, tie lengths, dimensional data, and other information that will be made part of the inspection.
 - (1) Crayon (keel);
 - (2) Permanent metal marker.
- (b) A mirror to be used to view difficult areas, especially the base or fillet of the rail, or connections to the moveable point frog and switch point area.
- (c) A cloth measuring tape or folding wooden ruler may be used to measure track components and ties in the turnouts. The tape or ruler shall be non-conducting. The tape or folding wood ruler can also be used to measure switch point throw, frog guard face, and guard check, stations for alignment measurements, rail flow, tie spacings, offsets, and other key dimensional data.
- (d) A standard combination track gauge with level shall be used so that gage, flangeway width, crosslevel, and superelevation measurements can be made.
 - (1) Level Board:
 - (i) The person who is responsible for performing the track inspection shall ensure that the level board is checked and maintained to measure correct crosslevel readings.
 - (2) Adjusting a Level Board:
 - (i) Set the level board on the tangent track where accuracy was checked and the difference in elevation between the two rails is known.
 - (ii) If required, turn the adjusting screw "C" to return the bubble "D" halfway between the readings for the known elevation. Center the bubble if possible.
 - Turning the adjusting screw to the right moves the bubble away from the screw (Memory Aid: "Turn screw right away").
 - Turning the screw to the left moves the bubble toward the screw.

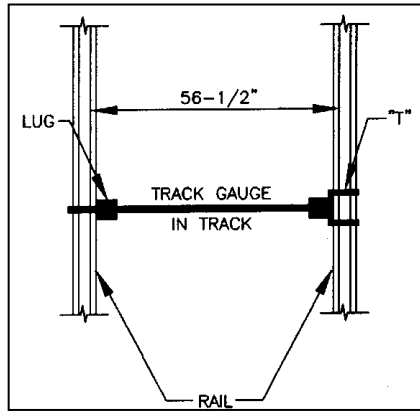


- (iii) Turn the level board end for end and place it at the same point on the track.
 - (iv) See if the bubble is centered or the same. If the bubble rests at the same place, the board is adjusted.
 - (v) If the bubble readings are not the same, or not centered, continue steps (ii) through (iv). When the bubble is always at the same location (and centered), the level board is adjusted.
- (3) Adjusting a level board by bubble positions:
- (i) Place level board on the rails.
 - (ii) Note position of the bubble.
 - (iii) Turn level board end for end and place it at the same point on the track.
 - (iv) Note position of the bubble again.
 - (v) If the bubble comes to rest in the same position both times "A", the board is in adjustment.
 - (vi) If the bubble comes to rest in different positions "B", adjustment of the board is necessary (see "Adjusting a Level Board" (d)(2)).

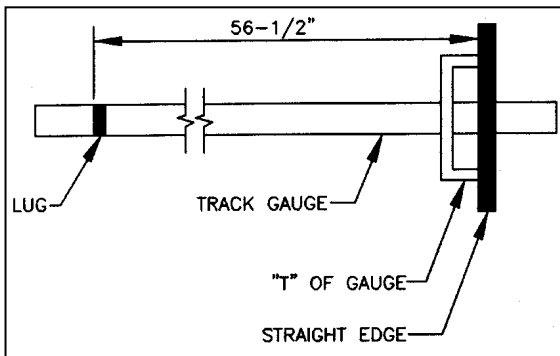


- (4) The Track Inspector shall check and verify daily prior to use that standard track gauges are correctly measuring track gage.

- (e) Checking a non-adjustable fixed track gauge.



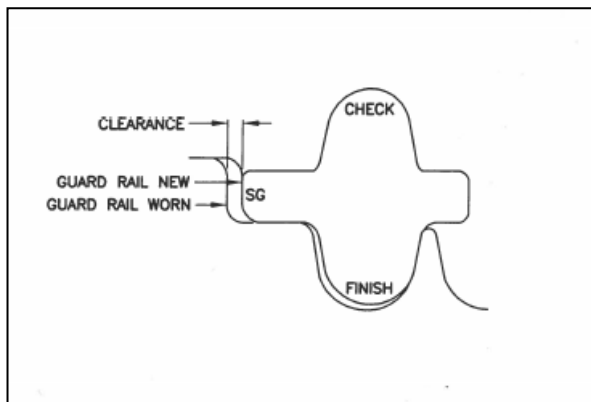
- (1) Turn the gauge upside down.
- (2) Place a straight edge along the "T" of gage.
- (3) Measure the distance between the nearest face of straight edge and the lug.
 - (i) If the measurement is $56-1/2"$, the track gauge is accurate.
 - (ii) If the measurement is not $56-1/2"$, the track gauge is inaccurate. DESTROY AND DO NOT USE IT!



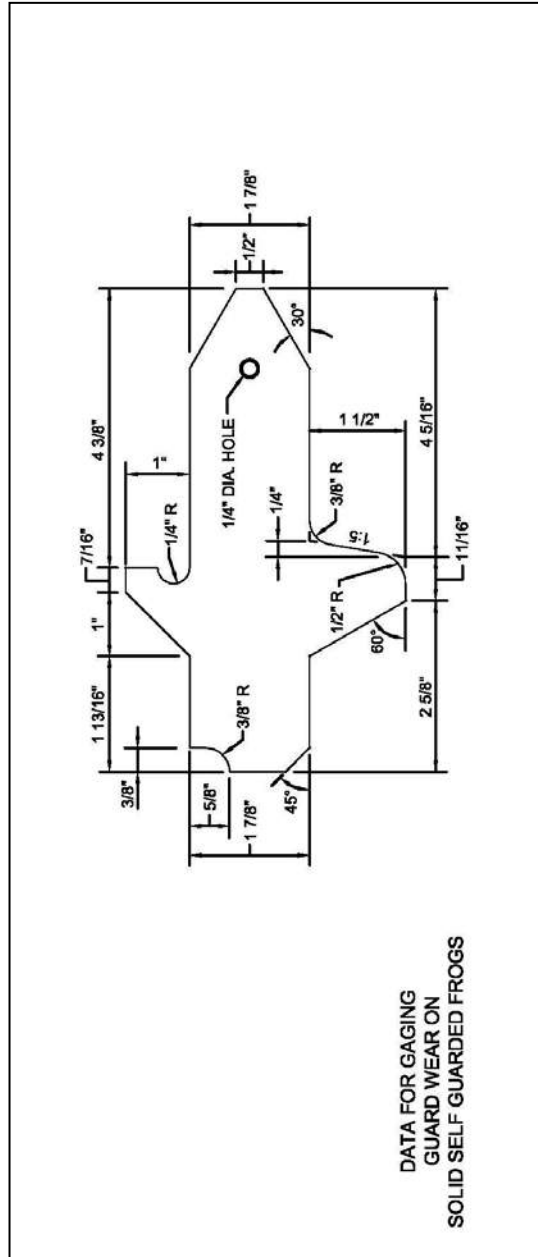
Track Gage Check

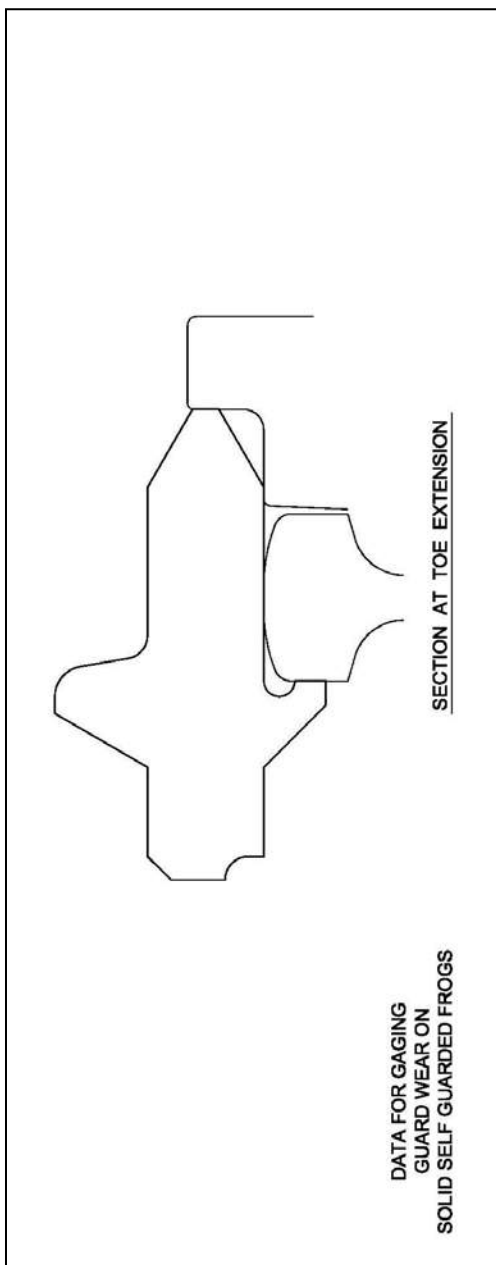
- (f) A machined straight edge (minimum of 18" in length) shall be used to measure batter and chipping of rail ends, wear, flattened rails, mismatches (gage and tread) and engine burns on frogs and rail heads.
- (g) A 36" machined straight edge with taper gauge shall be used to measure the straightness of field and plant welds.

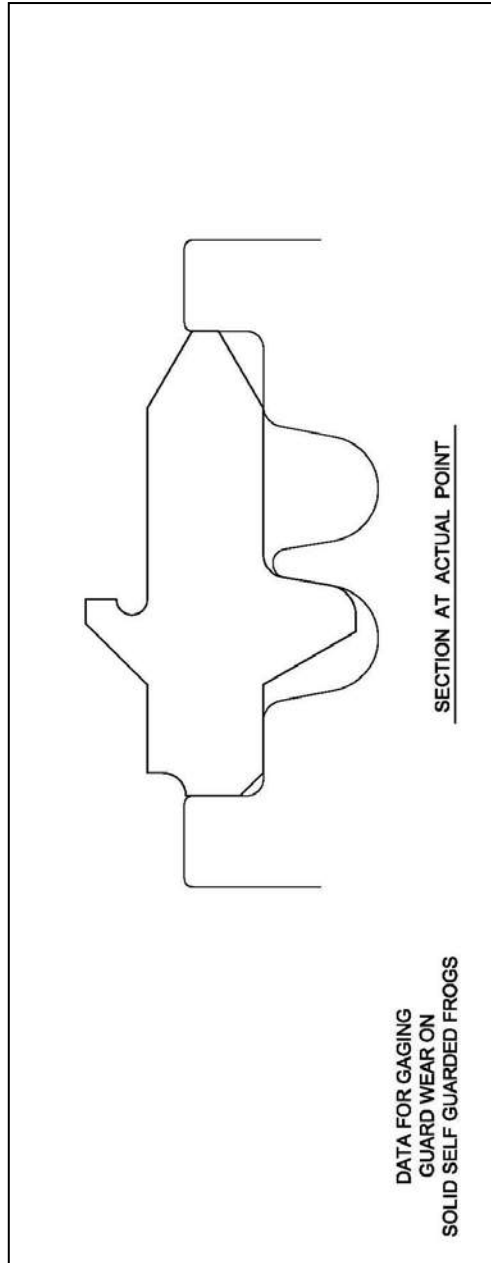
- (h) A taper gauge shall be used in conjunction with the straight edge to measure the depth of engine burns, flattened rails, and other anomalies in the rail head. In addition, the taper gauge shall be used to measure switch point/stock rail gap, and the gap at the moveable point frog.
- (i) Stringline equipment capable of measuring 31' and 62' chords shall be used to check "alignment" spots. A discussion of stringlining curves is given in §55.2(M).
- (j) Approved magnetic rail thermometer shall be:
 - (1) Calibrated in Fahrenheit, with a temperature range of 0°F - 150°F or as approved.
 - (2) Encased in housing with strong magnet(s) for attaching to web of rail.
 - (3) Meet AREMA Standard Rail Thermometer Plan 34-71, or approved equal.
- (k) The following gauges may be used to check critical dimensions in and around frogs:
 - (1) Flangeway gauge: the gauge is designed to measure the flangeway in worn frogs so that grinding or welding repairs can be programmed. The gauge to be used by the Track Inspector shall conform to AREMA Plan No. 790-94.
 - (2) Guard wear gauge: the gauge is designed to measure the wear on the guarding faces on a self-guarded frog.
 - (i) See AREMA plan for permissible variations in dimensions due to wear of frogs.
 - (3) The check gauge is used to test the flangeways in worn frogs and crossings for grinding or for welding repairs when necessary. It is designed for normal 1-7/8" flangeways and proper allowance should be made when used with wider flangeways. Standard contour gauge for self-guarded frogs is shown on the next page.
 - (4) The following check gauge graphic is used to measure flangeway widths in worn frogs and crossings to determine necessary welding and/or grinding repairs:
 - (i) The gage is designed for normal 1-7/8" flangeways.



- (5) The gauge to be used by the Track Inspector shall conform to AREMA Plan No. 790-02 as shown on the following pages.







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SUBPARTS A-H

RECOMMENDED PRACTICE FOR THE MAINTENANCE OF SPECIAL TRACKWORK

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RECOMMENDED PRACTICE FOR

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Subpart A – General

§1.0(STM) SCOPE

- (a) This subpart will provide guidance as to the types of maintenance and maintenance limits required for special trackwork.
- (b) This subpart shall be used by the MassDOT' s Operating Railroad Companies to maintain a safe, reliable track structure in the most economical and efficient manner possible.
- (c) Forces engaged in the repair of special trackwork and appliances shall be aware that their maintenance goal is to provide a safe and reliable track structure with a superior ride quality.
- (d) Ensuring adequate spare material inventory for all trackwork is the responsibility of the Operating Railroad Companies.

§2.0(STM) MAINTENANCE RESPONSIBILITIES

- (a) MOW personnel in charge of making repairs and performing maintenance of turnouts and other trackwork shall attend and successfully complete courses prescribed by the Operating Railroad Companies.
- (b) For Track Classes 1-5, individuals designated to supervise the maintenance, restoration, and renewal of trackwork shall be designated in accordance with FRA §213.7.

§3.0(STM) SCHEDULED MAINTENANCE ACTIVITIES

- (a) Turnouts and other special trackwork must be maintained on a regular basis to:
 - (1) Provide a safe and reliable track structure;
 - (2) Provide acceptable ride quality;
 - (3) Maximize the useful life of the special trackwork.
- (b) The maintenance schedule for special trackwork is driven by:
 - (1) Location of the special trackwork;
 - (2) Frequency and accumulated tonnage over the special trackwork;
 - (3) Type and maintenance history of the special trackwork;
 - (4) Inspection reports of the Operating Railroad Companies.
- (c) A summary of scheduled maintenance activities for special trackwork is given in the following table. This table is not intended to be all-inclusive and only identifies the major activities that are usually associated with special trackwork maintenance.

Scheduled Maintenance Activities for Special Trackwork
<ul style="list-style-type: none"> • Lubrication of switch and spring frog plates • Maintenance grinding of frog, switch point, and stock rails • Maintenance grinding of welds, forged areas, and slotting of mechanical joints • Maintenance welding of worn frogs • Maintenance welding of engine burns ($\leq 3/8"$) • Production grinding of special trackwork and approaches:* <ul style="list-style-type: none"> – 8-12 stone production switch grinder • Inspection of gage, with attention to the spread of the rail due to defective fasteners, timber, and/or rail wear <ul style="list-style-type: none"> – Inspection of guard face gage, guard check gage and track gage • Inspection of head block area (switch stand, timbers, and latches)* <ul style="list-style-type: none"> – Check the crank eye bolt under the switch stand to include cotter pin – Check the upright bolt and cotter pin at the connection between number 1 rod and the throw rod – Inspect all switch locks, circuit controller (CC) box, and unlock box for proper number and placement – Throw turnout to observe for loss of motion – Observe switch point and stock rail fit • Maintenance, cleaning, and adjustment of switch targets • Maintenance and replacement of gage plate and rod insulation* • Spot tamping of trackwork* • Out-of-face surfacing and alignment of trackwork* • Spot replacement of major trackwork components (stock rails, switch points, frogs, etc.)* • Spot rail replacement to include the replacement of insulated joints and curve worn rail* • Bolt maintenance: tighten or replace loose and defective bolts and torque to specifications; inspect and install cotter pins as required • Replacement or adjustment of defective fastener systems • Maintenance of drainage and waterways • Vegetation management • Ballast maintenance • Out-of-face ballast replacement (undercutting and shoulder ballast cleaning)*
<p>*The Signal Department shall be notified prior to maintenance and inspection as noted above. In addition, the Signal Department must be notified when work is required on the following items:</p> <ul style="list-style-type: none"> – Insulation on bridal plates – Insulation on switch rods – Repair/replacement of insulation joints – Protection of track wires and bond wires

§4.0(STM) UNSCHEDULED MAINTENANCE ACTIVITIES

- (a) Unscheduled maintenance activities are maintenance activities that cannot be planned or programmed.
- (b) Unscheduled maintenance of special trackwork and components can be due to:
 - (1) Any signal failure.
 - (2) Natural events, such as fire, flood, severe storms, and extreme temperatures or extreme variations in temperature, and earthquakes.
 - (3) A sudden change in the type of traffic, speed of traffic, or frequency of traffic over special trackwork.
 - (4) A “run through” or derailment within the area of special trackwork or a component of special trackwork.
 - (5) Failure of a component or components.

Subpart B – Maintenance Program

§5.0(STM) MAINTENANCE

Refer to §5.0(M)

§6.0(STM) PLANNING AND COORDINATION

- (a) Refer to §3.0(STM) for the list of maintenance activities that shall be planned and performed by track forces.
- (b) Programmed maintenance shall provide for the safety of train operations and shall be carried out in a cost-effective manner to provide maximum life to the trackwork and maximum benefit to the Operating Railroad Company.
- (c) The information contained in inspection reports shall be used to plan trackwork maintenance.
- (d) Program maintenance and/or capital maintenance and production should be internally coordinated with the Operating, Signal, and Bridge & Building (B&B) Department of the Operating Railroad Company.
- (e) Planned maintenance that involves work within private rights-of-way (i.e., grade crossings and utilities), shall be coordinated with fire, police, public safety, and appropriate utilities (call 811 for Dig Safe). Also coordinate with local Department of Public Utilities (DPU) and/or State District.

§7.0(STM) QUALITY CONTROL

- (a) The person in charge of performing the maintenance activity or repair shall be responsible for the overall quality of the work performed.
- (b) All maintenance work shall be performed in accordance with these practices.
- (c) An Operating Railroad Company Official shall periodically review the work performed for quality, consistency, and adherence to (b).
- (d) Trackwork repairs that are deficient:
 - (1) May be cause for remedial action.
 - (2) Shall be brought to the attention of an Operating Railroad Company Official.
- (e) An Operating Railroad Company Official shall see that any additional work necessary is performed to bring the repair into compliance with MassDOT recommended practice and shall re-inspect for substandard or deficient work.
- (f) Operating Railroad Company personnel are encouraged to make recommendations as to the required modifications to methods, procedures, and practice to improve the overall quality of work.

Subpart C – Scheduled Site Maintenance Activities

§33.0(STM) DRAINAGE AND WATERWAYS

Drainage in and around special trackwork shall be maintained in accordance with §33.0(M).

§37.0(STM) VEGETATION MANAGEMENT

Vegetation in and around special trackwork shall be maintained in accordance with §37.0(M).

Subpart D – Maintenance Limits

§50.0(STM) SCOPE

- (a) Maintenance is the repair or replacement of a component of special trackwork which may include switch points, frogs, and fastenings.
- (b) Maintenance limits are to be used as a triggering mechanism that prompts maintenance or reconstruction.
 - (1) It is MassDOT's goal to have special trackwork that is maintained above FRA minimum standards.
 - (2) As special trackwork components wear, maintenance should be programmed before the track reaches the maintenance limits.
 - (3) Maintenance must be executed whenever the maintenance limits are exceeded and completed prior to reaching the FRA minimum standards.
 - (4) Whenever possible, special trackwork should be repaired or reconstructed to as-new condition.
- (c) The maintenance limits and recommended practice for special trackwork and other trackwork are found in this subpart or the applicable maintenance sections.

§53.0(STM) GAGE

Refer to §53.0(M), "Gage."

§55.0(STM) ALIGNMENT

- (a) Maintenance shall be performed when alignment values reach the limits given in §55.0(M) Alignment.
- (b) The straight stock rail (open point) in a turnout is the line rail. If stations fall within undercut portions of the stock rail, alignment measurements may be taken on the field side of the stock rail.
- (c) In special trackwork, alignment deviation in curves is the difference in the mid-ordinate value between adjacent stations and not the average of multiple stations (uniformity) as given in FRA §213.55.

§63.0(STM) TRACK SURFACE

- (a) The following criteria:
 - (1) Will serve as a practical guide for the maintenance of smooth riding conditions in special trackwork; and
 - (2) Will minimize the wear on special trackwork, special trackwork components, and rail vehicles.
- (b) For Track Classes 1-5, surface may not deviate more than the amount prescribed in the table in §63.2(M).

Subpart E – General Maintenance Requirements

§133.0(STM) TURNOUTS AND CROSSOVERS

§133.1(STM) Use of Turnouts and Crossovers

- (a) Turnouts and crossovers are designated by their frog numbers and should be used as follows:
- (1) No. 20: At interlocking plants for crossing over of high speed trains from one main track to another main track (normally used in the same or reverse direction in locations where the normal speed is 50 MPH or more).
 - (2) No. 15: At interlocking plants for movements to another main track (normally used in the same or reverse direction, where conditions do not justify or afford the distance required for No. 20 frogs). For diverting trains to sidings or other tracks and returning trains to main tracks through power operated or spring switches.
 - (3) No. 10: For all other turnouts from main tracks and sidings, where practicable, and in yards and terminals.
 - (4) The use of other turnouts must have the approval of MassDOT Rail and Transit Division.

§133.2(STM) Speeds Through Turnouts

- (a) The maximum permissible speeds through turnouts when located in tangent track will be as follows:

Frog No.	Switch Point/ Switch Rail Length (Ft.)	Maximum Authorized Speeds (MAS) (MPH)
20	59'-6"	60*
20	39'	45
20	39'	60*
15	38'	30
15	26'	30
10	27'	15
10	16'-6"	15
8	16'-6"	10
Note: * With equilateral turnouts only.		

- (b) When turnouts or crossovers are located in curved tracks, speed must be adjusted in accordance with FRA §213.57.
- (c) The maximum authorized speed (MAS) through turnouts shall be designated by the MassDOT Rail and Transit Division.

§135.0(STM) SWITCHES

- (a) Switch points and moveable points should be kept in line and surface with all bolts tight and cotter pins in place.
- (b) Switch points must fit the stock rails closely and accurately, with a full bearing against the head of the stock rail. If a wear pattern indicates bearing only along the top edge of point, the cause of wear shall be investigated and corrected.
- (c) When an open switch point is found of more than 3/16", it must be immediately corrected and/or removed from service.
- (d) Each switch stand in connecting rod must be securely fastened and operable without excessive loss of motion.
 - (1) Connecting rod bolts must be of the proper size and installed with the bolt facing upwards and the nut on top.
 - (2) The upright bolt and nut shall be drilled to accept and installed with a cotter pin.
- (e) Switch points and stock rails should have the overflow ground off. Attention should be given to the overflow and fit of the back side of the switch point to the stock rail.
- (f) When necessary to replace individual switch points or stock rails, use replacement material of similar kind (i.e., Samson points to Samson stock rails; plain points to plain stock rails).
- (g) When replacing or changing a switch point, replace switch points and stock rails as a set:
 - (1) Fastenings must be intact and maintained so as to keep the components securely in place.
 - (2) Also, each switch, frog, and guard rail must be kept free of obstructions that may interfere with the passage of wheels.
 - (3) Classes 3-5 track must be fully box anchored through and on each side of track crossings and turnouts to restrain rail movement affecting the position of switch points and frogs. Elastic fasteners designed to restrict longitudinal rail movement are considered the same as rail anchors.
- (h) Adequately fasten switch points and stock rails to prevent lateral and longitudinal rail movement.
- (i) Upright bolts used with horizontal switch rods must be placed with nut ends up and nuts secured with cotter pins so they can be visually inspected.
- (j) Switch points shall be replaced when worn or chipped so that the top of the switch point, at any place, is more than 7/8" below the plane across the top of the stock rails.
- (k) Unusually chipped or worn switch points that are found to have an unprotected flat, vertical surface, 5/16" or more in width, at a depth of 3/4" below the top of the stock rail and switch point, must be removed from service and replaced immediately. This type of point wear may contribute to a wheel climb derailment.
- (l) Switch points shall be replaced when the raised portion of the switch point (rise) is worn down to the level of the top of the stock rail. The purpose of the rise is to prevent the outer edge of the wheel tread from striking the stock rail and rolling the stock rail out of the switch plates and causing a derailment.
- (m) Chipping or wear on any switch point should be investigated, its cause determined and corrective action taken. Wear or chipping produces a sloping surface on the face of the switch point which may tend to lift a wheel having an imperfect flange. The switch rail should be further examined to locate any point of hard contact by the wheel, which might contribute to wheel climb.

- (n) Spot grinding of points is allowed to remove chips, minor burns, small imperfections, small cracks, etc., with care being taken to insure that proper profile is restored to the switch point to prevent wheel climb. Grinding is not to exceed 7/8" below top of stock rail.
- (o) When changing switch points and curved closure rails, or when grinding switch points, lubricate as follows:
 - (1) The gage face of the curved point and the curved closure rail.
 - (2) Spot lubricate top of straight closure rail in vicinity of switch point.
 - (3) Lubricate gage face of all ground switch points.
- (p) Switch points, components, and connections must be examined frequently.
 - (1) It is important that the stock rails are securely seated and have no movement in the switch plates.
 - (2) Care should be taken to avoid canting the rail by over-tightening the rail braces.
 - (3) Switch plates shall have no movement on the ties.
- (q) Switch plates and moveable parts should be kept clean and lubricated with an approved graphite dry lubricant.
- (r) The heel of each switch point must be secured and the bolts of each heel must be kept tight (e.g., fixed blocks).
- (s) In yards when using No. 10 turnouts or smaller, and the maximum authorized speed does not exceed 15 MPH, a switch point guard may be applied to the outside of the stock rail.
- (t) Switch point guards shall be used only in yards and installed so that the distance of the guarding face of the guard to the gage face of the switch point is set at 3-15/16". The gage face of the switch point guard shall be restored by welding once the wear exceeds 1/4" (4-3/16").

§137.0(STM) FROGS

- (a) See AREMA Standard Track Plan No. 300 for guidance on the use of frogs.
- (b) All metal flow from frogs must be ground promptly and the gage and guard edges of castings rounded. The radius shall be ground to match the original radius and contour of the frog. See AREMA Standard Track Plans or manufacturer's shop drawing.
- (c) New frogs should be ground 30 days following installation. Subsequent grinding will be required monthly for the first several months depending on frog type and service.
- (d) Frog points, frog castings, and wheel relief areas (false flange), should be built up by welding to maintain as-new cross section. Spring rail frogs also have false flange relief areas by design. See AREMA Standard Track Plans or manufacturer's shop drawing.
- (e) Worn frogs should be repaired in track by an approved electric welding method and then ground to the correct contour.
- (f) Each flangeway in special trackwork must be at least 1-1/2" wide with a 1/8" head radius.
- (g) The flangeway depth, measured from a plane across the wheel-bearing area of the frog, may not be less than 1-3/8" in Track Class 1 or less than 1-1/2" in Track Classes 2-5.
- (h) If a frog point is chipped, broken, or worn more than 1/2" down and 3" back, the frog should be repaired.
- (i) If a frog point is chipped, broken, or worn more than 5/8" down and 6" back, operating speed over that frog may not be more than 10 MPH.

- (j) If a riser or insert of a frog is broken out or worn down more than 3/8" below the original contour, operating speed over that frog may not be more than 10 MPH.
- (k) Welding repairs on manganese (Mn) steel frogs shall be performed by a welder certified to weld manganese steel.
- (l) All frog repairs should be ground to contour. Square corners lead to breakouts into the flangeway.
- (m) Frog welding may be prolonged indefinitely by proper grinding practices.
- (n) Missing or loose frog bolts shall be retightened or replaced with bolts of correct length and diameter.
- (o) All frogs requiring repairs that cannot be made in track shall be removed from track and shipped to the designated repair point.
- (p) Frogs shall be supported on effective timber that is fully tamped to minimize wear and damage from train traffic.

§139.0(STM) SPRING RAIL FROGS

- (a) Spring frogs have a moveable wing rail that is normally held closed against the body of the frog except when pushed open by a diverging movement. This results in a smoother ride for main line moves.
- (b) Spring frogs must be inspected to comply with FRA §213.139.
- (c) Recommended practice for the proper installation, inspection, and maintenance:
 - (1) Spring frogs must be inspected on foot at least once per week.
 - (2) Good surface, line, drainage, and timber condition must be maintained.
 - (3) The outer edge of a wheel tread must not be permitted to contact the gage side of the spring wing rail.
 - (4) All bolts should be tight:
 - (i) Some body bolts are special thin head bolts.
 - (ii) Maintenance body bolts (studs) are available for locations where frog must be disassembled to install new bolt.
 - (5) Ensure spring wing can move freely.
- (d) Spring rail frogs are to be used on industrial tracks that are used infrequently (unless approved by the MassDOT Rail and Transit Division).
- (e) The clearance between the hold-down housing and the horn may not be more than 1/8" at the top and 1/8" at the bottom. Other issues to be addressed:
 - (1) Wing and point must fit properly. Grind overflow to prevent chipping. Grind gage corner radius to 5/8".
 - (2) The spring wing to frog point is designed to have a 3/8" gap at the point. A gap of no more than 3/4" must be maintained.
 - (3) Ensure there is sufficient tension on spring:
 - (i) The spring nuts should be adjusted to compress the spring 1" (1/4" between spring follower and housing).
 - (ii) This results in approximately 600 pounds of force from the spring.
- (f) Typically, by design, there is a gap of up to 3/8" between the spring wing rail and frog point within the first 5" of the frog point. It is desirable to maintain contact between the spring wing rail and the remainder of the frog.
 - (1) A gap less than 3/4" is to be maintained.

- (2) If a gap of 3/4" exists, check the compression of the springs on the wing rail to see if the springs must be adjusted and/or replaced.
- (g) Particular attention should be paid to the guard face gage in the point area on the straight side of the turnout. A guard rail protects the straight move through the length of the moveable wing.
- (h) The outer edge of a wheel tread must not contact the gage side of a spring wing rail.
- (i) When surfacing a spring frog:
 - (1) Do not jack the frog with production equipment between the toe and heel. This could bend the base plate.
 - (2) Use hydraulic hand jacks.
- (j) Base plate and horns should be lubricated with switch plate lubricant.
- (k) The toe of each wing rail must be solidly tamped and fully bolted, or preferably, field welded.
- (l) Spring frogs should be ground 30 days after installation. Subsequent grinding may be required monthly for the first several months depending on frog type and service.
- (m) Welding of a spring rail frog may only be performed with the permission of the MassDOT Rail and Transit Division.
 - (1) If a spring rail frog is welded in the field, the first train will operate at Class 1 speeds, freight trains at 10 MPH, and passenger trains at 15 MPH.
 - (2) The spring rail frog will be re-inspected after the first train before the track will be returned to MAS.
- (n) Each spring must have sufficient compression force to hold the spring wing rail against the point rail.
- (o) Lubricate spring frog plates with approved lubricant in the Spring, Summer and Fall and "Ice Free Switch" anti-icing agent in the winter (or approved equal).
- (p) The opening between the spring wing rail and frog point of spring frog shall be kept free of any debris and snow and ice that may impede the operation of the spring wing rail.

§141.0(STM) SELF-GUARDED FROGS

- (a) Self-guarded frogs shall be used in non-main tracks where the speed does not exceed 15 MPH.
- (b) If, because of wear, repairs need to be made to the guarding face of a self-guarded frog:
 - (1) The raised guard face of a self-guarded frog may not be worn horizontally more than 3/8".
 - (2) Repairs require the use of a contour gauge (see §150.1(M), "Inspection Tools").
 - (3) The track should be taken out of service.
 - (4) When repairing the guard face of a self-guarded frog, the build-up of weld material must be made from the top down to prevent wheel climb
 - (5) When repairs are made to a self-guarded frog, the guard face must be restored before rebuilding the point. This practice will ensure that the wheel does not strike the rebuilt frog point.

§142.0(STM) GUARD RAILS

§142.1(STM) Guard Rails - General

Guard rails shall be furnished in accordance with MBTA Standard Plan Book, AREMA Standard Plan Book, or as approved by the MassDOT Rail and Transit Division.

§142.2(STM) Guard Rails - Use

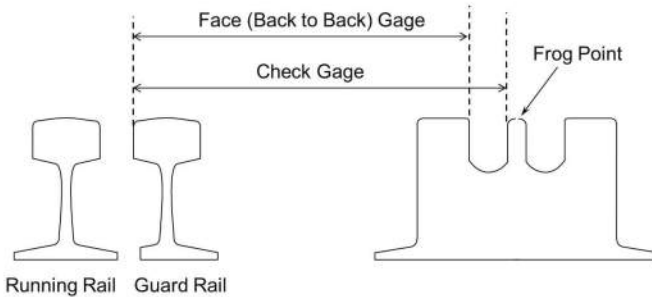
- (a) Guard rails used with No. 15 spring frogs shall be a minimum of 16'-0" in length. Guard rails used with frogs of lesser number shall be a minimum of 13'-0" in length.
- (b) Guard rails used with No. 10 spring frogs shall be a minimum of 16'-0" in length, or as approved by the MassDOT Rail and Transit Division.
- (c) Guard rails installed in accordance with previous standard practice may be continued in general use until their replacement becomes necessary.
- (d) Relay quality hook flange guard rails must only be reinstalled in other than main tracks.

§143.0(STM) FROG GUARD RAIL AND GUARD FACES; GAGE

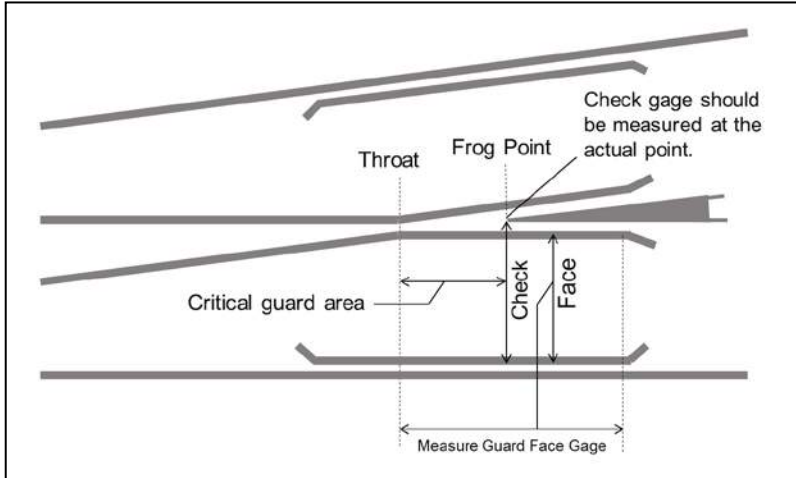
- (a) If possible, when performing trackwork maintenance, repairs shall be made to restore the installation dimensions of guard rails:

Track gage	56-1/2"
Guard check gage (may not be less than)	54-5/8"
Guard face gage (back to back) (may not be more than)	52-3/4"

- (b) Maintenance limits contained in Paragraph (a) are more restrictive than those found in FRA §213.143.
- (c) See the following diagrams showing guard check gage and guard face measurement locations.



Guard Check and Guard Face Gage



Guard Check and Guard Face Gage Measurement Locations

§144.0(STM) INSTALLATION OF SPECIAL TRACKWORK GUIDELINES

- (a) Trackwork constructed in track, or at the site, shall be built to, and perform to the MBTA Standard Track Plans, AREMA Standard Track Plans, or as approved by the MassDOT Railroad Transit Division.
- (b) Turnouts and crossovers shall not be placed in curves or spirals without the approval of the MassDOT Rail and Transit Division.
- (c) Pre-plated, pre-assembled switch timber and pre-fabricated switch nose panels (if truckable), are preferred.
- (d) Care must be used in unloading and handling all trackwork, timber, and turnouts. This includes handling and unloading from flatbed cars and trucks and assembling and loading onto transport cars.
- (e) A minimum 12" bed of clean-bottom compacted ballast shall be provided with good drainage. See MBTA Standard Plan Nos. 1000 and 1002.
 - (1) If roadbed materials (sub-ballast and sub-grade) are inadequate, an 8" layer of compacted sub-ballast shall be installed; or
 - (2) A 5" layer of compacted hot-mix asphalt under-layment as per MBTA Standard Plan No. 1030; or
 - (3) A Geo-Web (or approved equal) sized appropriately for the field conditions (4", 6", or 8") may be used as determined by the MassDOT Rail and Transit Division.
- (f) When practicable, special trackwork should be completely installed with switches connected to their operating mechanisms and properly adjusted before trains are permitted to move over the trackwork.
- (g) Care must be used when installing trackwork panels to prevent rail bending, tie splitting, or tie cracking, as well as bending and/or breaking fasteners and OTM.

- (h) When installing special trackwork panels, bottom ballast should be furnished and installed and compacted level to within 2" to 4" of final bottom of tie grade. The final lift shall be nominal 1-1/2". (Ballast bagging or blocking can be used when undercutting or in emergencies.)
- (i) Initial surfacing lifts for special trackwork shall be limited to 2" increments. This size lift helps prevent tie breakage, and the bending of rail and plates in spring and moveable point frogs. The final lift shall be a nominal 1-1/2".
- (j) Where only one switch rail (closed point) has been installed in a main track turnout in existing main track, and it is necessary to move trains over the turnout, the following precautions must be taken:
 - (1) All switch plates on the turnout side must be in the correct position and clipped and/or fully fastened.
 - (2) The switch rail must be securely held against its stock rail by driving a spike in each of the first two ties back of the point and, where possible, spikes must pass through holes in the switch plates.
 - (3) The switch point must be secured to the stock rail by standard clamping devices.
 - (4) Unconnected ends of lead rails, or the toe of the frog, must be protected by a tapered wedge fastened to the tie to protect against dragging equipment.
 - (5) The free end of stock rail must be fastened down to prevent movement and a tapered wedge fastened to prevent against dragging equipment.
 - (6) Facing point train movements shall only be made under a 10 MPH temporary speed restriction unless point detection is provided.
- (k) If both switch rails have been installed, but not properly connected to the switch operating mechanism, the following must be done before trains are permitted to move over the main track turnout:
 - (1) Switch rods must be installed.
 - (2) The main track switch rail must be secured against its stock rail, as required above.
 - (3) The diverting switch rail (open point) must be blocked by driving a wooden wedge, not less than 18" long, between the switch rail and the stock rail.
 - (4) On wood ties, a wedge must be secured in place by means of a lag screw or heavy nail through one clip bolt hole and a piece of wood placed against the end of the wedge and spiked to the first and second ties ahead of the point.
 - (5) Unless the curved lead has been installed and spiked or clipped to prevent movement, a connecting rail shall be fastened to the heel of the open switch rail and moved away from the running rail so as to provide at least 5" clearance between rail heads.
 - (6) Facing point train movements shall only be made under a 10 MPH temporary speed restriction unless point detection is provided.
- (l) The main track guard rail must be correctly placed and clipped or spiked if the frog has been installed.
- (m) Unconnected ends of lead rails or the toe of the frog must be protected by a riser wedge fastened to the tie to protect against dragging equipment.
- (n) Where track is signaled, a switch circuit controller shall be installed, tested and functioning, by a signal employee of the Operating Railroad Company.

Subpart F – Scheduled Maintenance Activities

§150.0(STM) DESCRIPTION OF SCHEDULED MAINTENANCE ACTIVITIES TO BE PERFORMED

Refer to the table in §3.0(STM) for the list of major trackwork activities to be performed by the Operating Railroad Company.

§151.0(STM) RECORD OF TRACKWORK DISTURBANCE IN CWR TERRITORY

- (a) Maintenance activities performed in trackwork installed in CWR track can cause a change in the rail neutral temperature (RNT) of the CWR and cause track instability in and around the special trackwork.
- (b) MOW employees in charge of, or responsible for maintenance work performed in and around special trackwork in CWR track, shall be thoroughly familiar with and understand and comply with Appendix A, "Continuous Welded Rail (CWR) Procedures."

§152.0(STM) LUBRICATION OF SWITCHES AND FROGS

- (a) Switch and spring frog plates shall be cleaned and lubricated as necessary.
- (b) The Signal Maintainer has the overall responsibility to lubricate powered switches and derails in signaled track.
- (c) The Track Department has the responsibility to lubricate all other switches, derails, and spring frogs with approved seasonal lubricants.

§152.1(STM) Lubrication of New Switch Points

- (a) New switch points shall be greased after installation.
 - (1) Special attention should be paid to lubricate the gage face of the diverging point from point of switch to point of frog.
- (b) Existing switch points that show indication of wear should be carefully lubricated frequently on the gage face so as to prevent migration to the top of rail, as well as excessive ground and ballast contamination.

§156.0(STM) SURFACING (SPOT TAMPING) - GENERAL

- (a) Spot tamping (less than 200') is required to restore the surface and line when deviations approach the alignment and surface maintenance limits given in §§55.0(M) and 63.0(M).
- (b) Spot tamping is required to eliminate the excessive deflection and pumping of ties which:
 - (1) Overstresses clips causing premature failure or backing out of clips.
 - (2) Increases abrasion of the wood ties.
 - (3) Fouls the ballast.
 - (4) Increases ballast abrasion and wear.
 - (5) Changes the load distribution over the length of the tie which, in some cases, may overstress the tie.
- (c) Tamping should be performed in such a manner as to prevent the centerbinding of timber and ties.
- (d) In wood tie turnouts, head block and movement ties may require tamping by hand to provide full support of the long timber.

- (e) When spot surfacing in welded rail territory, see Appendix A, “Continuous Welded Rail (CWR) Procedures.”

§157.0(STM) OUT-OF-FACE SURFACING AND ALIGNMENT

- (a) Out-of-face surfacing (greater than 200') shall be accomplished by multiple tool switch tampers, ballast stabilizers, and ballast regulators.
- (b) Out-of-face surfacing is usually required when there are multiple spots to be surfaced that are greater than 200' in length.
- (c) Out-of-face surfacing is required to restore the overall surface and line when deviations approach the alignment and surface maintenance limits given in §§55.0(M) and 63.0(M).
- (d) The Operating Railroad Company shall plan any out-of-face surfacing program for trackwork. The Operating Railroad Company MOW personnel shall make use of information on the Track Inspection Report, Special Track Inspection Report, Monthly Switch Inspection Report, track geometry car readings (if available) and train rides when planning the out-of-face surfacing program.
- (e) Out-of-face surfacing and aligning of CWR track should be avoided:
 - (1) When the ambient air temperature is 80°F, or rail temperature is 100°F, or above;
 - (2) Anytime there is an ambient air temperature of 40°F, or below, for a 24-hour period. To surface and align track below the above temperature requires the approval of MassDOT Rail and Transit Division.
 - (3) Any other time when questionable track conditions exist that will not safely support surface and alignment of track.
- (f) When out-of-face surfacing in welded rail territory, see Appendix A, “Continuous Welded Rail (CWR) Procedures.”

§158.0(STM) SPOT REPLACEMENT OF MAJOR COMPONENTS

- (a) During the useful life of special trackwork, it may be required to replace major components and systems as part of a programmed maintenance activity. The major components include, but are not limited to:
 - (1) Switch points, stock rails, and/or point protectors.
 - (2) Switch plates or tie plates and clips and fasteners.
 - (3) Frogs and guard rails.
 - (4) Bolt assemblies.
 - (5) Closure rails (associated joint and insulated joints).
 - (6) Switch timber and headblock ties.
 - (7) Switch stands, switch machines, and/or details.
 - (8) Switch targets, handles, rods, and cotter pins.
- (b) The replacement of major components is based on:
 - (1) The physical condition of the component.
 - (2) The amount of measured wear on the component compared to an established maximum “wear limit” as given in this Part.
 - (3) The ability of the component to sustain MAS and meet the operational requirements of the railroad.
 - (4) Lost motion of any moving switch parts.

- (c) When changing major components, all work performed shall be reported on the daily Track Inspection Report and be available to the MassDOT Rail and Transit for review.

\$159.0(STM) SPOT RAIL REPLACEMENT

- (a) Rail replacement shall be performed on an as-needed basis as traffic and local conditions warrant.
- (b) The replacement of rail is based on:
- (1) The age and physical condition of the rail.
 - (2) The existence of a rail defect as defined in FRA §213.113.
 - (3) The amount of measured wear on the rail compared to an established “wear limit” for that rail as given in §113.2(M).
 - (4) Switch point to stock rail wear limits as given in this Part take precedence over the maintenance limits given in §113.2(M).
- (c) A “Rail Failure in Main Track Report” must be filled out and available for MassDOT Rail and Transit Division to review every time a rail is changed.

\$160.0(STM) BOLTS AND LOCK WASHERS

- (a) During the useful life of trackwork there may be a requirement to replace broken or defective bolts and/or washers in frogs, heel blocks, and at permanently bolted joints.
- (b) When evaluating the performance of bolts:
- (1) Verify that the bolt is of the correct diameter, length, and type.
 - (2) Visually inspect the performance of the bolt and washer under load.
 - (3) Visually inspect the joint or appliance and look for signs of vertical movement, batter, crushing, excessive flow, or excessive wear in the component affixed with the bolt and washer.
 - (4) Visually inspect the condition of crib ballast and general line and surface at that location.
 - (5) Visually inspect the condition of ties, plates, and clips at bolted locations.
- (c) When changing a bolt in a joint, frog, or in a switch point, tighten all other bolts in the immediate vicinity.
- (d) The preferred method of tightening new bolts is with a torque wrench and multiplier that applies the recommended level of torque (foot-pounds) to the bolt. See the following tables.

Recommended Torque Values in ft.-lb. to Produce the Minimum Specified Tension in Society for Automotive Engineers (SAE) Grade 5 Bolts			
Bolt Diameter	Min Tension (lb.)	Lubricated Condition⁽¹⁾	Non-Lubricated Condition⁽¹⁾
1/2"	12,000	80	105
5/8"	18,000	155	210
3/4"	28,000	275	370
7/8"	39,000	450	600
1"	51,000	670	800
1-1/8"	56,000	825	1,100
1-1/4"	71,000	1,165	1,550
1-3/8"	85,000	1,535	2,040
Note: (1) Lubricated torque values shall be achieved by applying a metal-based lubricant to the bolt threads.			

Recommended Torque Values in ft.-lb. to Produce the Minimum Specified Tension in SAE Grade 8 Bolts			
Bolt Diameter	Min Tension (lb.)	Lubricated Condition⁽¹⁾	Non-Lubricated Condition⁽¹⁾
1/2"	15,000	100	130
5/8"	24,000	195	265
3/4"	35,000	345	460
7/8"	49,000	565	750
1"	64,000	840	1,120
1-1/8"	80,000	1,180	1,575
1-1/4"	102,000	1,675	2,230
1-3/8"	121,000	2,185	2,910
Note: (1) Lubricated torque values shall be achieved by applying a metal-based lubricant to the bolt threads.			

§161.0(STM) FASTENING SYSTEMS

- (a) During the useful life of trackwork, it may be required to change rail fasteners (e.g., clips or spikes or screw spikes) as a normal maintenance activity.
- (b) The replacement of fasteners is based on:
 - (1) The physical condition of the fastener (worn or corroded and/or broken or missing).
 - (2) The ability of the fastener and the fastening system to minimize the horizontal and vertical movement, as well as the longitudinal movement of the rail or components (e.g., switch points, frogs and guard rail), and to sustain maximum authorized speed.
- (c) When evaluating the performance of fasteners, the Foreman shall:
 - (1) Verify that the correct type of fastener is being used.
 - (2) Visually inspect the fastener for cracks and breaks.
 - (3) Visually inspect the fastener to see if they are overdriven.
 - (4) Visually inspect the components being fastened and look for signs of vertical or horizontal movement or excessive wear.
- (d) Clips that have repeatedly backed-out or fallen-out should be replaced with new clips and not reused.

Subpart G – Turnouts in Signalized Track

§170.0(STM) GENERAL PROCEDURES FOR WORK ON TURNOUTS IN SIGNED TERRITORY

- (a) When adjusting or working on a main track turnout in signaled territory:
 - (1) Notify the Signal Maintainer.
 - (2) Obtain foul time, track time or other form of Roadway Worker Protection (RWP) from the dispatcher.
 - (3) Hold a job briefing.
 - (4) Block the switch point.
 - (5) Perform the work.
 - (6) Remove blocking.
 - (7) Perform obstruction test (by Signal Maintainer).
 - (8) Make sure hand-thrown turnout is aligned and locked with an approved lock in the normal position before returning to service.
 - (9) Return track to service.

Subpart H – Mechanisms, Appliances, and Devices

§200.0(STM) SWITCH OPERATING MECHANISMS

§200.1(STM) Use of Mechanisms

- (a) Switches shall be operated by approved types of mechanisms as follows:
 - (1) Power mechanisms as approved by the MassDOT Rail and Transit Division after recommendation by the Signal Department.
 - (2) Spring switches: Manually operated switch mechanisms, which are supplemented by slow-acting spring devices that permit wheels to trail through switches set for the opposite route, may be used with the approval of the MassDOT Rail and Transit Division.
 - (3) Approved type of new installation switch stands (unless approved by MassDOT Rail and Transit Division), are: Racor Model 36EH (High Mast) for mainlines and Racor Model 36E for yards.
 - (4) Manual operated mechanisms shall use the “back saver” and/or “triangular hand level” handles for new installations.

§200.2(STM) Installation of Switch Stands

- (a) Manually operated switch stands shall be placed so that the operating rod is in tension when the switch is set in normal position.
- (b) Whenever possible, the switch stand handle shall be positioned facing the frog when the switch is in the normal position.
- (c) Where crossover switches are protected by signals, a switch locking arrangement shall be provided.
- (d) Switch stands for all tracks shall be located to serve the safety and efficiency of employees.

§205.0(STM) SWITCH POINT POSITION INDICATORS (TARGETS)

§205.1(STM) General

- (a) Where required, indicators shall be provided on all non-interlocked switches to give a clear and distinct indication of the position of the switch points
- (b) Switch point targets shall be reflectorized. The height of the centerline of the target shall not exceed 20" above the track ties. Targets higher than this are called “high targets.”
- (c) Generally, high targets with the EH36 high stand are used on all main track.
- (d) Generally, low targets are used in yards and at locations on main tracks where clearance precludes the use of a high stand.

§205.2(STM) Installation of Position Indicators

Targets shall be set at right angles to the track and perpendicular to the headblock ties.

§205.3(STM) Maintenance

Switch targets should be kept clean to provide uniform brightness and visibility.

§205.4(STM) Position Indication

- (a) In order to give a clear and distinct indication of the position of non-interlocked switch points, colored targets shall be provided, in addition to the switch stands.

- (b) Target colors are given in the Northeast Operating Rule Advisory Committee (NORAC) Rule Book (Rule 104H).
 - (1) Where switch targets are used, a green or white banner indicates normal position of the switch, and a red or yellow banner indicates reverse position.
 - (2) Green and white banners are used on main tracks, and red and yellow banners are used on other than main tracks and yards.

§205.5(STM) Distance from Rail for Switch Stands and Switch Point Targets

- (a) Switch stands, not between tracks, must be placed so that the distance from the gage of the nearest rail to the center of the spindle with a low mast is 4'-1" and with a high mast is 7'-0".
- (b) Low target masts placed between tracks must be installed as follows:

Track Center Distance (at least)	Minimum Distance From Gage of Nearest Rail to Center of Spindle
12'-2" but less than 13'	3'-8-3/4"
13' or greater	4'-1

- (c) All powered switch machines shall be installed as per Signal Department Instructions.

§210.0(STM) SWITCH STAND MAINTENANCE

- (a) Switches, switch stands, and operating rods must be examined frequently. Broken, damaged, or missing parts shall be replaced immediately.
- (b) Regular inspection shall be in accordance with FRA §213.233, and if necessary, corrective action must be taken immediately.
- (c) Worn switch latches must be replaced before the wear is sufficient to permit the switch lever to be thrown without manually releasing the latch (keeper).
- (d) Special attention should be taken to ensure that the cotter pin is maintained at the clevis location at the base of the switch stand and at the connection to the No. 1 rod (FRA §213.135).

§220.0(STM) SWITCH LOCKS

- (a) At all main track switches, throw levers of switch stands, shall be secured by two latches (for normal and reverse positions), and locked by a standard switch lock. The lock is to be fastened by a chain to the switch stand, or tie, so that the switch can only be locked in the normal position.
- (b) The throw levers of switch stands in other than main or secondary track, shall be provided with latches, but shall be provided with padlocks only when required.
- (c) The standard switch lock used by the Operating Railroad Company is to be approved by MassDOT Rail and Transit Division.
- (d) Recommended operating and cleaning procedures for switch locks are:
 - (1) Unlock the padlock and open the shackle to soak and wash the lock thoroughly in the recommended cleaner (LPS Instant Super Cleaner/Degreaser) or equivalent. This will remove any oil, grease, and their foreign matter from the

area of the locking balls. If feasible, use of an ultrasonic cleaning tank is advised. This type of device produces superior results.

- (2) If cleaning by hand, use a squirt bottle to force the cleaning solution into the locking ball cavities. This will complete the cleaning and flushing of the locking ball area.
- (3) Do not oil, grease, or graphite the lock. Lubricate only with a light, non-grease substance, such as LPS #1 Greaseless Lubricant.

§300.0(STM) DERAILS

§300.1(STM) Position of Derails

The “normal” position of a derail shall be to derail wheels of rolling equipment away from the main track or structure. The “reverse” position shall permit the unobstructed movement of equipment.

§300.2(STM) Use of Derails

- (a) Derails shall be used on all tracks.
- (b) Selection of derail type:
 - (1) A **double switch point derail** will be used at the following locations:
 - (i) Where the track on which the derail is to be placed descends towards the main track requiring protection.
 - (ii) On all tracks, even if descending away from the main track, if any portion of that track is higher in elevation than the track at the derail location.
 - (iii) Where the industry moves rail cars using on or off track equipment or by gravity or with a car puller.
 - (iv) On tracks used for loading, unloading, or storage of cars containing hazardous (hazmat) materials as defined in the U.S. Hazardous Material Instructions for Rail.
 - (v) Where operating conditions demand positive derailing protection.
 - (2) A **sliding rail** may be used where track on which the derail is to be placed is level or descends away from the main track requiring protection.
 - (3) A **hinge derail** may be used in yard areas where a derail operating stand would adversely impact the normal walking path.
 - (4) A **portable derail** is used to provide protection to personnel working on or about a track to make work limits inaccessible (see RWP Rules for Operating Railroad Company), or to protect equipment stored temporarily on a track not normally used for storage.

§300.3(STM) Types of Derails

- (a) Derails are generally of three kinds: the “split switch,” the “sliding block,” and the “hinged block” type.
- (b) Where derails are prescribed, the split switch type shall be used on side tracks or industrial tracks as follows:
 - (1) At all locations where the side track or industrial track is on a descending grade to the main track.
 - (2) Within interlocking limits, in main tracks, in secondary tracks, and as designated by the MassDOT Rail and Transit Division.
 - (3) In tracks where it is possible for the speed of rolling equipment to exceed 15 MPH.

- (c) Approved sliding block type derails shall be used in other than main tracks with speeds less than 15 MPH at other locations than those given in Paragraph (b) above.
- (d) Hinged block derails are usually used in yard limits or in conjunction with Roadway Worker Protection (RWP) practices.

§300.4(STM) Installation of Derails

- (a) A derail shall be placed a sufficient distance back of the clearance point, not less than 12', to ensure that derailed rolling equipment will not foul the main or other protected track.
- (b) When using single point split switch derails, a deflecting rail must be used.
- (c) Where deflecting rails are used:
 - (1) The minimum length shall be 18'.
 - (2) The nearest end shall be 10' from the derail.
 - (3) The flangeway opening at the end nearest to the derail shall be 4".
 - (4) The end farthest from the derail shall be set to provide a 12" clear opening between running rail opposite the derail and the deflecting rail.
 - (5) The deflecting rail shall be of a section and weight that is not greater than that of the running rails, and, preferably less.
 - (6) The deflecting rail should be spiked to every tie with two rail holding spikes, one on each side of the rail base.
 - (7) Deflecting rails shall be fully anchored or otherwise secured to ensure that they do not move longitudinally.
 - (8) Derails are to be installed in accordance with manufacturer's recommendations.
 - (9) Existing installations of derails need not be changed to meet these provisions until renewals are necessary, or unless so ordered by the MassDOT Rail and Transit Division.

§300.5(STM) Operation of Derails

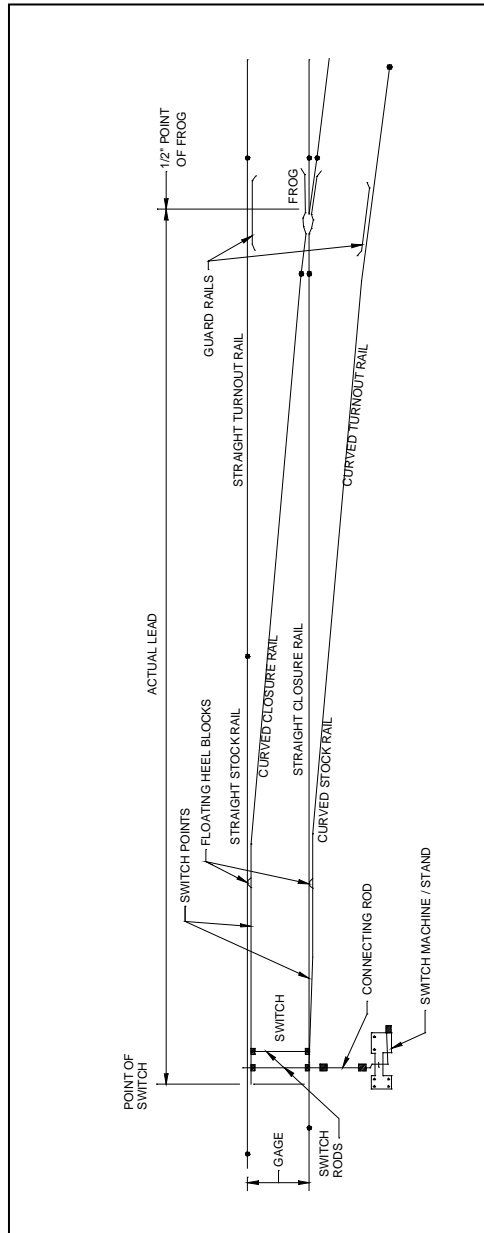
- (a) Lever stands of approved types may be used for operating derails. Where practicable, the distance from the center line of the lever stand spindle to the gage of the nearest rail shall be at least 50".
- (b) Derails shall be provided with standard switch padlocks fastened to the tie by a chain and staple, so that the lever or derail can be locked only in the normal position.

§300.6(STM) Maintenance of Derails

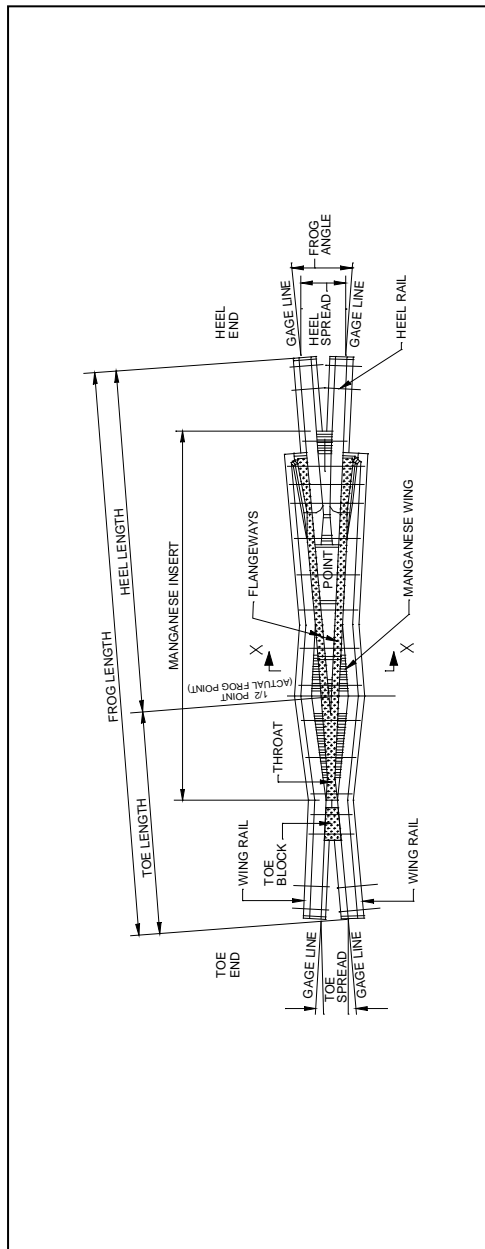
- (a) Sliding block or hinged block derails shall be painted yellow.
- (b) Dirt and weeds must be kept away from derails.
- (c) Ballast, snow, and ice must be kept away from derails.

Subpart I – Schematics / Photographs

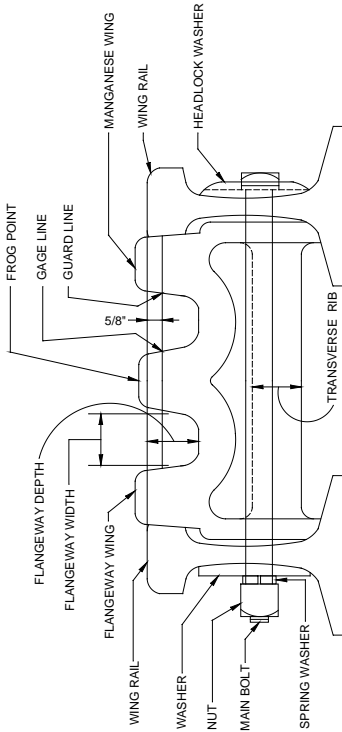
- (a) Schematics and photos of trackwork are provided in the MW-1 to illustrate the name, location, and general arrangement of trackwork types and major components.
- (b) Trackwork types and components are shown below in photos and drawings and include:
 - 1. Conventional Turnouts
 - 2a. Railbound Manganese Frog (RBM)
 - 2b. Railbound Manganese Frog – Section X-X
 - 3a. Self-Guarded Manganese Frog
 - 3b. Self-Guarded Frog – Section Y-Y
 - 4a. Spring Frog Arrangement
 - 4b. Spring Frog Details
 - 5a. Guard Rail - Hook Flange Type
 - 5b. Guard Rail - Hook Flange Type – Section A-A
 - 6a. Hinged Derail
 - 6b. Sliding Block Derail
 - 6c. Double Switch Point Derail
 - 7a. Switch Stand Type 36
 - 7b. Switch Stand Type 36
 - 8a. Western-Cullen Type Bumping Post
 - 8b. High Energy Hydraulic Bumping Post



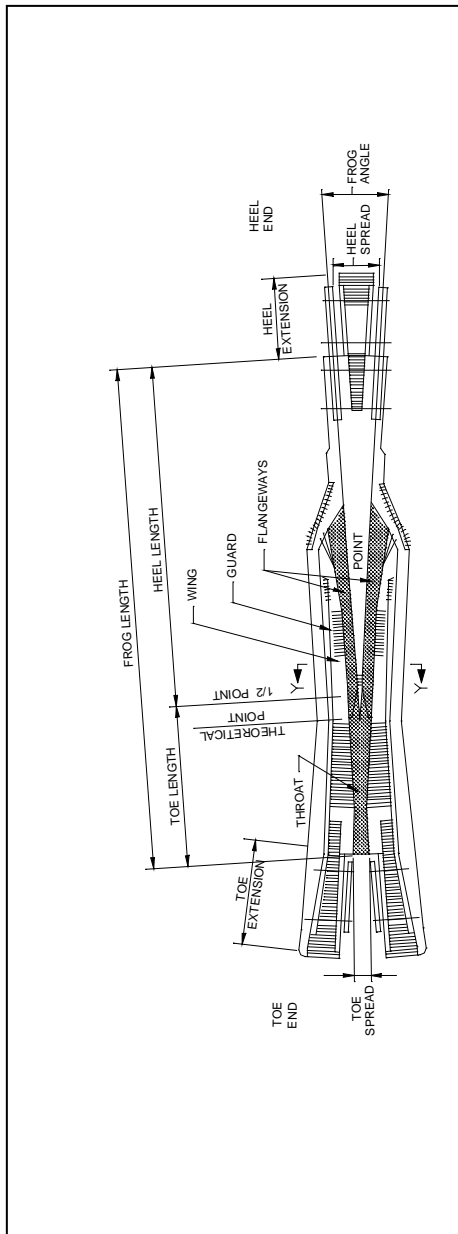
1. Conventional Turnout



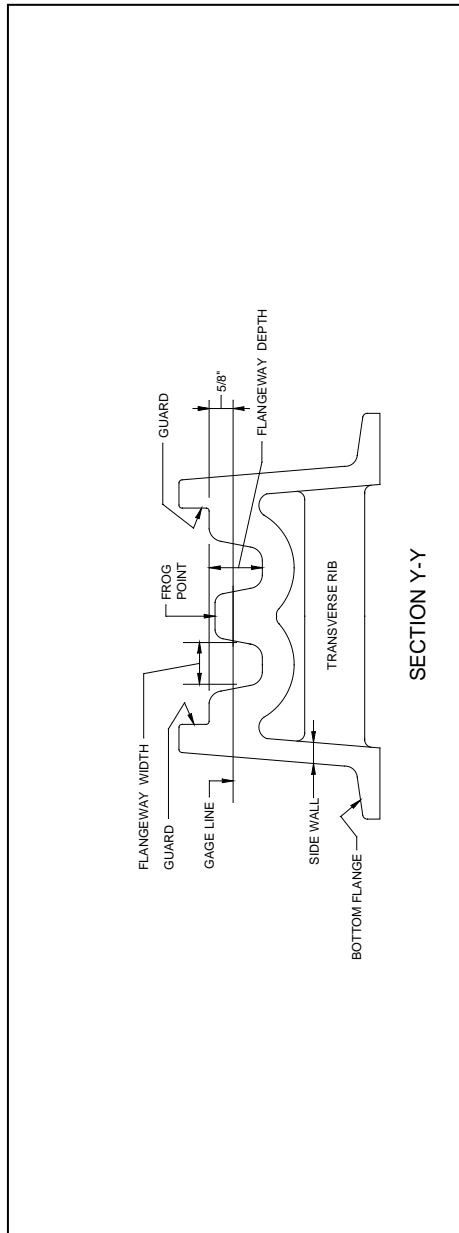
2a. Railbound Manganese Frog (RBM)



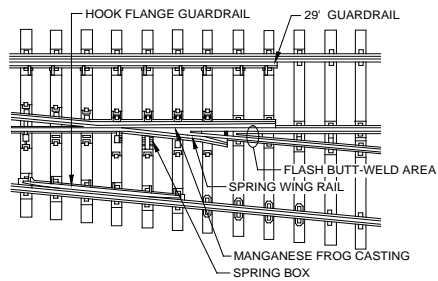
2b. Railbound Manganese Frog – Section X-X



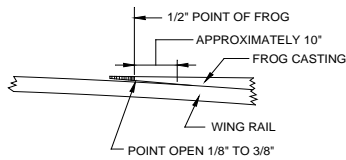
3a. Self-Guarded Manganese Frog



3b. Self-Guarded Frog – Section Y-Y



MANGANESE SPRING FROG LAYOUT

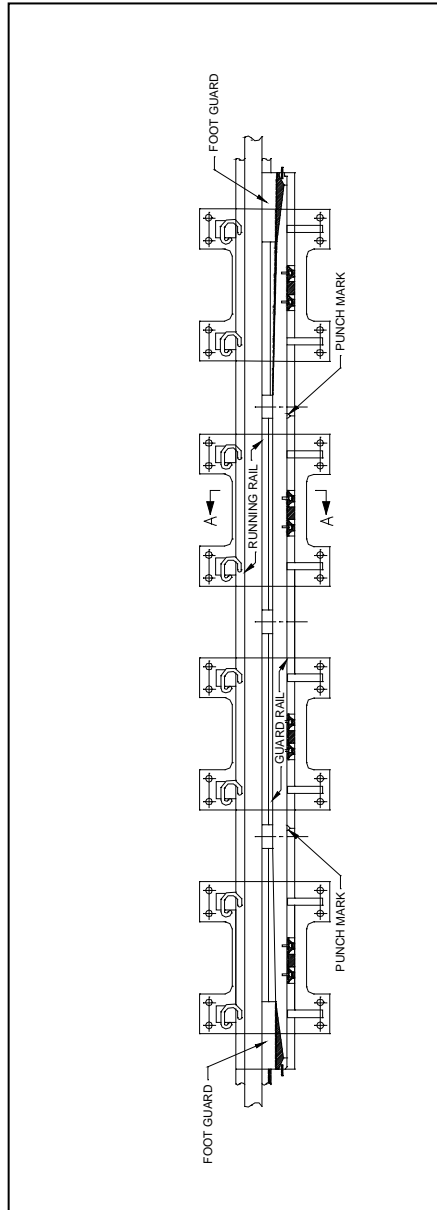


DETAIL OF SPRING FROG POINT AREA

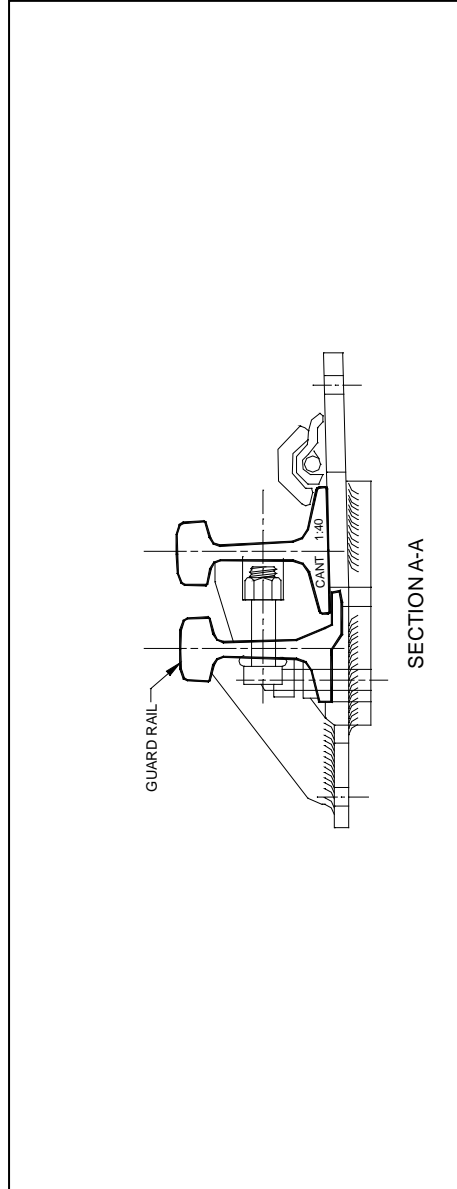
4a. Spring Frog Arrangement



4b. Spring Frog Details



5a. Guard Rail – Hook Flange Type



5b. Guard Rail – Hook Flange Type – Section A-A



6a. Hinged Derail



6b. Sliding Block Derail



6c. Double Switch Point Derail



7a. Switch Stand Type 36



7b. Switch Stand Type 36



8a. Western-Cullen Type Bumping Post



8b. High Energy Hydraulic Bumping Post



APPENDIX A

CONTINUOUS WELDED RAIL (CWR) PROCEDURES

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APPENDIX A
MINIMUM RECOMMENDED REQUIREMENTS
TO BE INCLUDED IN THE
OPERATING RAILROAD'S CWR PLAN
CONTENTS AS PER FRA 213.118 & 213.119

1.0 APPLICABILITY

The installation, adjustment, maintenance and inspection of continuous welded rail (CWR) shall be performed in accordance with FRA Part 213, Track Safety Standard's §213.118 and §213.119. As such, the requirements herein are based on the FRA/Rail Safety Advisory Committee (RSAC) Generic Policy document provided to the U.S. railroads as a part of the October 2009 enacted FRA safety rule and are based on current best practice guidelines on CWR in providing minimum requirements on CWR.

These MassDOT procedures are aimed to aid and assist the Railroad Operating Companies to maintain MassDOT-owned tracks in a safe and efficient manner. Performing CWR installation, maintenance, adjustment and inspection in accordance with the provisions and requirements stipulated herein will meet the expectations of the Commonwealth and provide uniform practice between the different properties of the Railroad Operating Companies.

This document details MassDOT's policy on installing, adjusting, maintaining, and inspecting CWR track. Each section details how the individual MassDOT rail operator applies its standards and procedures to comply with FRA standards.

1.1 INTRODUCTION

- (a) Continuous Welded Rail (CWR) is defined as any rail that contains no joints in 400' or greater in length. This document will serve as the recommended practice for the installation, adjustment, maintenance, and inspection of CWR. Rail that is installed as CWR and subsequently has additional joints installed within the limits of the rail will still be considered as CWR, and subject to the requirements of this document. Track laid with CWR is referred to as "CWR Track." Any employee who installs, adjusts, maintains and inspects CWR must have a copy of their approved FRA Plan (§213.118 and 213.119).
- (b) If the Operating Railroad cannot comply with the minimum recommended requirements found in Appendix A, they shall immediately notify MassDOT Rail and Transit Division.
- (c) Preparation and care:
 - (1) **Programmed tie renewals shall be completed in advance of rail laying.**
 - (2) **Track shall be surfaced and aligned prior to CWR installation.**
 - (3) Track to be laid with CWR must have standard ballast section (shoulders and cribs) for welded rail before CWR is installed.
 - (4) Rails should be examined for defects and damage prior to laying in track.
 - (5) At the time of installation, care should be taken so that no damage to rail or fastenings will result.
 - (6) All ties, to include loose ties, should be tamped to full bearing under the rail, with a small tamper, during rail laying operations ahead of the spiker.

2.0 FABRICATION AND DISTRIBUTION

- (a) Unloading:
 - (1) CWR should be unloaded as close as possible to the position where it is to be installed with a minimum of further handling, giving special attention to accurately locating the ends of CWR.
 - (2) CWR should be placed parallel with the track and base down, avoiding excessive bending or damage, making use of suitable mechanical equipment when available. Care should be taken to avoid placing rails on drainage facilities and other civil structures.
 - (3) CWR ends must be bypassed.
- (b) Use of CWR on MassDOT Rail and Transit Division owned lines:
 - (1) CWR fabricated by an approved process may be laid without restriction in fully ballasted main and secondary tracks. When welded rail is laid on curves, particularly those sharper than 6 degrees, it must be closely monitored for any indication of movement up out of the plates.
 - (2) CWR may be laid across open deck bridges where bridge ties are spaced with timber blocks between ties provided that the following conditions are satisfied:
 - (i) The anchoring of open deck bridges shall be approved by the Operating Railroad's Bridge Engineer.
 - (ii) Per MBTA Standard Plan, all ties and blocks in a panel are tightly jacked and fastened together with guard timbers or spacing bars secured by lag screws in every tie. See latest MBTA Standard Plan.
 - (iii) Per MBTA Standard Plan, bridge ties are securely fastened to steel structure by means of a hook bolts, tie anchors, or other approved holding device. See latest MBTA Standard Plan.
 - (iv) The bridge structure is properly anchored to abutments and piers to prevent any movement other than normal expansion.
 - (v) CWR is anchored to the bridge ties in both directions in accordance with Section 4.0 of this document.
 - (3) After application of hook bolts, tie anchors or other approved holding devices, these devices must be checked and retightened weekly until ties have been fully seated on top flanges of built up members.

3.0 INSTALLATION AND ADJUSTMENT OF CWR

- (a) Definitions:
 - (1) Neutral Temperature: The rail neutral temperature (RNT) is the temperature at which a rail is neither in tension or compression (i.e., when it has zero longitudinal force).
 - (2) The Rail Laying Temperature (RLT): The temperature at which the rail is installed that is sufficiently high so as to provide a high RNT to prevent possible track buckling.
 - (i) CWR on MassDOT Rail and Transit Division owned lines shall be installed at an RLT of 105°F with an allowable construction tolerance of -10°F to +10°F or 95°F to 115°F. **The target RLT shall be at least 105°F.**
 - (ii) When laying and/or distressing rail, the required minimum expansion shall be determined by using a target RLT of at least 105°F (see Section 3.0 and Attachment "B").
 - (iii) When repairing a service failure to include broken joint bars, pulled apart joints, a broken rail, a broken weld (shop or field), the replacement of a plug

rail or a rail cut in the field, the repair shall be made to ensure that the RNT after the repair is made is at or above RLT-10°F (95°F) (see Attachments A and C).

- (3) Temperature Differential: The difference between the target rail laying temperature and the actual rail temperature taken at the time of installation is called the temperature differential (TD).
 - (i) CWR laying and adjusting procedures have been established to take into account these temperature differences.
 - (ii) If the rail temperature is below desired RNT of 105°F, the rail must be expanded to the target RLT of at least 105°F.
 - (iii) The rail expansion required is marked at the quarter points in the field on the string to be expanded.
 - (iv) RNT is achieved when the correct expansion amounts have been realized at the quarter points.**
 - (v) RNT is not achieved when the required rail temperature of 105°F has been reached unless the required expansion has been realized.
- (b) Installation of CWR:
 - (1) Programmed tie renewals shall be completed in advance of rail laying.
 - (2) Track shall be placed in good line and surface prior to rail renewals.
 - (3) Track to be laid with CWR must have standard ballast section for welded rail before installation of CWR.
 - (4) Rails should be examined for defects and damage prior to laying in track.
 - (5) At the time of installation, care should be taken so that no damage to rail or fastenings will result.
 - (6) All ties, to include loose ties, should be tamped with a small tamper to full bearing under the rail, during rail laying operations ahead of the spiker.
 - (7) Any alignment deviation reduces the temperature at which a track will buckle. As an example, an alignment deviation of about 1" may reduce the buckling temperature from 10 – 15 °F°. In addition, an alignment deviation from a Class 5 line defect to a Class 3 line defect (1" to 1 1/8") may reduce the buckling potential by 15 - 20°F, depending on track parameters and conditions."
 - (8) The target RLT and RNT is at least 105°F unless approved by the MassDOT Rail and Transit Division.**
 - (9) CWR shall be anchored or have resilient fasteners applied ("clipped") at a rail temperature of between 95°F and 115°F, unless otherwise directed by MassDOT Rail and Transit Division. This is known as the "Desired Rail Installation Temperature Range."
 - (10) An approved rail thermometer (magnetic) shall be used to measure the rail temperature of all CWR before it is anchored or clipped. The thermometer should be placed on the web of rail just above the bottom fillet, on the side of the rail that is shielded from the direct rays of the sun and left there long enough (5 minutes) to determine the temperature accurately.
 - (11) When the rail temperature is lower than the target RNT of 105°F an approved rail heating device or a hydraulic rail stretcher must be used for expanding the CWR to make proper adjustment.
 - (12) A rail puller can be used to hold the required expansion, and/or to help get the required expansion. At least 20 ties on the next string to be distressed shall be

- box anchored and/or clipped to provide sufficient holding power for the rail puller to hold or pull the string being expanded.
- (13) Where CWR has been anchored and/or clipped at a rail temperature below 105°F- 10°F (RLT -10°F) and not expanded to the target RNT of 105°F during the rail laying operation, the rail shall be inspected by a person qualified on §213.7(a)(b)(c)(d). A TSR shall be placed, if necessary, and then removed when the rail is expanded to a target RNT of 105°F.
 - (14) If the CWR is anchored and/or clipped at a rail temperature greater than 115°F (RLT +10°F), up to and including 125°F, the rail may remain in track without restriction.
 - (15) The following information shall be recorded on the field side web of the individual string (with permanent metal marker) as the strings are being laid:
 - (i) String number
 - (ii) Date installed or adjusted or distressed
 - (iii) Length of string in feet
 - (iv) Existing rail temperature/preferred rail neutral temperature
 - (v) Total expansion required at end of string (if appropriate)
 - (16) The person in charge of installing the CWR shall be responsible for recording on the appropriate Form ("CWR Rail Expansion/Heat Record Report") the amount of required expansion and the rail temperature at each CWR string is anchored. Copies of these forms should be forwarded to MassDOT Rail and Transit Division. See Appendix "E", Form "RC".
 - (17) The "CWR Rail Expansion/Heat Record Report(s)" for any CWR laid in track and or distressed shall be retained by the Railroad Operating Companies until the CWR is readjusted and/or removed from service.
- (c) Adjustment/Distressing:
- (1) The target RNT is always 105° or greater. When the rail temperature is lower than the target RNT of 105°F an approved rail heating device, a hydraulic rail stretcher or heating by natural means or the ambient temperature shall be used to expand the CWR at its quarter points to achieve proper adjustment.
 - (2) Adjusting CWR strings to increase RNT by natural means or by using the ambient temperature is allowed only if the unadjusted rail temperature falls in the Desired Rail Installation Temperature Range of RLT -10°F to +10°F or 95°F to 115°F.
 - (3) All rail anchors and/or resilient fasteners must be removed from strings of CWR requiring adjustment to permit the desired expansion or contraction at the quarter points of the CWR string.
 - (4) The anchor and/or clip removal should start at the end of the string at the last quarter point to be expanded and move back towards the ¼ point or beginning of the string to be expanded. This is especially important if the rail to be expanded is in compression.
 - (5) With conventional cut spikes and plates, an approved mechanical vibratory device may be used to free the rail. Additionally, rail holding spikes shall be pulled if restraining rail movement.
 - (6) With elastic fasteners and rolled plates, it may be necessary to pick the rail up out of the plates and set on spikes and/or rollers about every 20th tie so as to permit the unrestrained movement of the CWR when being expanded. Again, this process should start from the last quarter point to be expanded and proceed

- back towards the ¼ point or beginning of the string to be expanded. This is especially important if the rail to be expanded is in compression.
- (7) The rail head must not be struck with a hammer at any time; to include expanding the rail.
 - (8) CWR should be heated and vibrated so that expansion is introduced from one end of each string to the other end in the direction of rail laying.
 - (9) All rail anchors or resilient fasteners must be re-applied immediately after the CWR string has achieved proper expansion at the quarter points based upon the target RNT of at least 105°.
 - (10) The number of inches each CWR string should be expanded during the rail laying operation may be determined by calculation according to the following formula:

$$A = 0.000078 \times (T_D - T_E) \times L$$

where:

A = the amount (inches) of length a CWR string must be increased or decreased to reach the target rail laying or rail neutral temperature

T_E = the existing rail temperature of the CWR before the heating process has begun

T_D = the target neutral temperature or rail laying temperature (105°F) of the CWR at the end of the heating process

L = the length of the CWR in feet

Example: How much expansion is required to adjust the length of a 1,450 ft. CWR string, anchored at a rail temperature of 50°F to the target rail laying/rail neutral temperature of 105°F? Subtract 50°F from 105°F to obtain a difference of 55°F and then multiply as follows:

$$0.000078 \times 1,450 \times (105 - 50) = 0.000078 \times 1,450 \times 55 = 6.22 \text{ inches.}$$

Say 6.25 inches

Or use “Change In Rail Length Due To Change In Rail Temperature” Table on the back of Form “RC”, “Report of Rail Clipping/Anchoring” found in Attachment E.

- (11) A space equal to the amount of expansion required for each string of CWR should be provided between the far end of the string being expanded and the near end of the next adjacent string.
- (12) The clipping or anchoring operation shall consist of sufficient personnel so that the work will progress closely enough behind the heating and/or pulling process so that the string is held in place, and no loss of expansion occurs.
- (13) Quarter points should be marked on the rail and the tie plate, so that the amount of expansion can be accurately determined. The tie plate used for marking as a reference point must be one that is either doweled or has been spiked, or screw lagged; so that it will not move as the rail expands. Particular attention must be

- paid to insure that the rail does not bind on tie plates, spikes or other obstructions.
- (14) Heating should commence at the beginning of the first CWR string and steadily applied while moving forward until the required expansion has been obtained at the end of the string. Uniformity of expansion is to be controlled by marking each quarter of the string and introducing expansion as follows:
- ¼ point - ¼ of total expansion
½ point - ½ of total expansion
¾ point - ¾ of total expansion
End of the string – 100% of total expansion
- (15) If when heating, the heated CWR string does not have the required expansion at each quarter point, the heater will back over the heated portion, without applying heat, and then reheat the rail until the necessary expansion is obtained.
- (16) During and subsequent to heating, resilient fasteners or anchors shall be applied to the patterns specified in Section 4.0 to prevent the rail from losing expansion. If resilient fasteners fail to hold expansion, rail anchors in the pattern of the following paragraph shall be applied.
- (17) Rail anchors and/or clips may be used to control and maintain the expansion realized in a string of CWR while the rail string is being anchored and/or clipped in its entirety. A minimum of 20 consecutive ties shall be solid box anchored and/or clipped at the fully expanded end of the string , to hold the expansion while applying all other anchors and or clips as required.
- (18) A rail puller can be used to hold the required expansion and/or to help get the required expansion. At least 20 ties on the next string ahead of the string being distressed shall be box anchored and/or clipped to provide sufficient holding power for the rail puller to hold or pull the string being expanded.
- (19) The entire CWR string is to be anchored and/or clipped in accordance with Section 4.0 “Anchoring of CWR” before the track is returned to service and trains are permitted to operate.
- (20) An approved rail thermometer (magnetic) shall be used to measure the rail temperature of all CWR before it is anchored or clipped. The thermometer should be placed on the web of rail just above the bottom fillet, on the side of the rail that is shielded from the direct rays of the sun and left there long enough (5 minutes) to determine the temperature accurately.
- (21) Where CWR has been anchored and/or clipped at a rail temperature below 95°F (RLT -10°F) and not expanded to the target RNT of 105°F during the rail laying operation, the rail shall be inspected by a person qualified on §213.7(a)(b)(c)(d). A TSR shall be placed, if necessary, and the removed when the rail is expanded to at least 95°F (RLT -10°F).
- (22) If the CWR is anchored and/or clipped at a temperature greater than 115°F (RLT +10°F), up to and including 125°F, the rail may remain in track without restriction.
- (23) If the CWR is anchored and/or clipped at a temperature greater than 125°F, the rail may remain in track without restriction with the permission of the MassDOT Rail and Transit Division.
- (24) The following information shall be recorded on the field side web of the individual string (with permanent metal marker) as the strings are being laid:
- (i) String number

- (ii) Date installed or adjusted or distressed
 - (iii) Length of string in feet
 - (iv) Existing rail temperature/preferred RNT
 - (v) Total expansion required at end of string (if appropriate)
- (25) The person in charge of installing the CWR shall be responsible for recording on the appropriate Form ("CWR Rail Expansion/Heat Record Report") the rail temperature for which each CWR string is anchored. Copies of these forms should be forwarded to MassDOT Rail and Transit Division. See Appendix "E", Form "RC".
- (26) The "CWR Rail Expansion/Heat Record Report(s)" for any CWR laid in track and or distressed shall be retained by the Railroad Operating Companies until the CWR is readjusted and/or **removed from service**.

4.0 ANCHORING OF CWR

- (a) CWR Rail Anchoring Requirements: The following anchoring requirements apply to all CWR tracks.
- (1) Existing anchor patterns may remain in place until CWR is installed.
 - (2) Where the anchoring function is otherwise provided, such as with a resilient fastener, rail anchors may be omitted.
 - (3) Anchors may not be applied where they will interfere with signal or other track appliances or where they are inaccessible for adjustment or inspection.
 - (4) Anchoring must effectively restrain the longitudinal rail movement.
 - (5) Rail must be adjusted and/or anchors must be added to rail that is moving, or where the existing anchors do not have effective holding power to restrain longitudinal movement.
 - (6) Anchor pattern may be varied, if possible, to avoid placing anchors against deteriorated ties.
 - (7) When a crosstie has four properly installed resilient fasteners, or four properly installed rail anchors, it will be considered to be fully box anchored tie.
- (b) When laying or distressing welded rail, rail anchors are used to maintain the desired expansion and length of CWR strings. Crossties shall be fully box anchored in accordance with the following:
- (1) Every Tie:
 - (i) Curves 3° and over
 - (ii) Through all rails of turnouts and crossovers, where practicable
 - (iii) For 195' in each direction from:
 - a. Main track turnouts and crossovers
 - b. Track crossings (diamonds)
 - c. Highway grade crossings
 - d. On the fixed side of expansion joints
 - e. On the approaches to open deck bridges
 - f. On both sides of all insulated joints (bonded and/or non-bonded)
 - g. On both sides of hot box, dragging equipment and wheel impact load detectors
 - h. Before bumping posts

- (2) Every Other Tie:
 - (i) Through the remainder of CWR strings where full boxing is not specified above.
- (3) Bridge Anchor Patterns:
 - (i) Ballast deck bridges should be anchored with the same pattern as the rail on each approach to the bridge.
 - (ii) Open deck bridges should be anchored according to the following table or as approved by the MassDOT Rail and Transit Division:

Length of Continuous Open Deck Portion** (ft.)	Individual Span Length (ft.)	Rail Anchor Requirements	Sliding Joint Requirements
100 ft. or less	All spans	Every 3 rd or 4 th tie. See §111.0(M) Bridge Timbers*	None required
Greater than 100 ft.	100 ft. or less	Every 3 rd or 4 th tie. See §111.0(M) Bridge Timbers*	None required
	Greater than 100 ft.	Every 3 rd or 4 th tie. See §111.0(M) Bridge Timbers*	As per requirements of MassDOT Rail and Transit Division

* Box anchors are to be applied only to ties that are hook bolted to the span.

**See MBTA Book of Standard Plans Drawing Nos. 1232 and 1236.

- (4) Other Anchor Patterns:
 - (a) Under pavement off the ends of grade crossing panels.
 - (b) Under grade crossing surfaces as per crossing surface manufacturer.
 - (c) In areas adjacent to the expansion side of expansion joints as authorized and approved by MassDOT Rail and Transit Division.
- (c) Anchor Requirements After Making Rail Repairs in CWR and Adding Joints:
 - (1) When repairs are made to stripped joint or failed bar on CWR that already exists in track, the adjustment or addition of anchors will be as prescribed below:

Condition	Action
Bolted joint in CWR experiencing a service failure (pull-apart) or failed bar(s) with gap* present (FRA §213.119(c)(3))	<p>Weld Joint, OR</p> <p>Remediate Joint conditions and replace four (4) bolts (new, in-kind or stronger) and weld joint within 30 days, OR</p> <p>Replace broken bar(s), install 2 additional bolts (6 total) and adjust anchors (ballast permitting), OR</p> <p>Replace bars, bolts (if broken or missing) and anchor every tie for 195' in both directions (ballast permitting) OR</p> <p>Add rail and make out Form "TD" and make future repairs</p>
* Gap exists if it cannot be closed with a drift pin.	

5.0 MAINTENANCE OF THE DESIRED RAIL NEUTRAL TEMPERATURE IN PREVIOUSLY INSTALLED CWR

(a) Maintaining Desired Neutral Temperature Range: Broken or Defective Rail, Pull-Apart (Service Failures) And/or Tight Rail or Track Buckle

- (1) This section addresses repairs for broken or defective rail, and corrections made for tight rail, track buckle or pull-apart.
- (2) Also see Attachments A, B, and C.
- (3) When performing this work, care shall be taken not to add rail to the track.
- (4) In general, if a length of rail is installed in CWR, it should have a length less than the rail removed and/or not exceed the length of rail removed (DO NOT ADD RAIL).
- (5) Before joint bars are removed and/or a rail is cut, reference marks shall be added at tie plates and on the base of the rail. Reference marks can be used to determine how much the joint opens, or how much rail is cut out (if rail is in compression) or how much rail is added.
- (6) The use of reference marks includes:
 - Marking the locations where the joint is to be removed or the rail is to be cut
 - Marking the rail outside the limits of the joint bars
 - Measuring the distance between the reference marks and mark it on the rail
 - Installing the rail and re-measure the distance between reference marks
 - Recording the difference and documenting the location
- (7) If rail is added for any reason, such as repairing a pull-apart, making emergency repairs, fixing a service failure or any other interim repair, measure and record the amount of rail added on Form "TD" so that adjustments can be made before reaching the rail return temperature.
- (8) Existing RNT shall be estimated where the rail has pulled apart, broken, or been cut for defect removal by using the appropriate charts in Attachment A.

- (9) To determine the pre-break/cut RNT, record the length of the rail end gap, rail temperature, rail base size and existing rail anchorage and use tables in Attachment “A”.
 - (10) The estimated pre-break/cut RNT shall be recorded on Form “TD” so that additional required repairs, if any, can be tracked and done before rail return temperatures are exceeded (see Attachment C).
 - (11) Work performed by Railroad Operating Companies, such as rail that has pulled apart, broken, or been cut for service failures to make repairs to CWR, shall be readjusted to a preferred RLT or RNT of 105°F +/- 10°F. **The minimum RNT is 95°F** (see Section 3.0).
 - (12) If rail has not been adjusted before rail return temperatures exceed the values in Attachment C, then a temporary speed restriction (TSR) of 25 MPH shall be placed. A TSR of 40 MPH may be placed if a required daily inspection is made during the heat of the day, every day, **until the adjustment and permanent repair is made.**
 - (13) For detailed procedures on adjusting pulled apart, broken, or cut rail, refer to Attachment C.
- (b) **Adjusting or Distressing Previously Installed CWR**
- (1) Rail can be distressed by heating rail and/or pulling rail that has a RNT below the target RLT of 105°F. In a curve, the CWR can be distressed or the curve can be lined out. When distressing or adjusting CWR with an RNT below the target RLT of 105°F, the following is a *general* procedure:
 - (2) Procedure:
 - (i) Determine amount of rail to be distressed on either side of a cut and/or joint (up to 800’ on either side of the joint and/or cut for a total of 1,600’ maximum).
 - (ii) Cut rail at the end or in center of rail to be distressed (see Attachment B).
 - (iii) Remove anchors or clips in both directions from either side of the cut back to the distressing limit or to a fixed object or an appliance in the track (turnout or grade crossing) or structure that prevents rail movement.
 - (iv) Wait until rails stop moving. The rail ends may need to be misaligned to allow for expansion and then trimmed one time (if possible) to fit.
 - (v) Take the rail temperature.
 - (vi) Compare the rail temperature to the target RLT=105°F to determine the temperature differential (TD).
 - (vii) If the actual rail temperature is lower than the RLT of 105°F, use the Rail Expansion Table in Attachment E (Form “RC”) to determine the rail length to be removed based on the total distance the anchors or clips that have been removed.
 - (viii) Expand rail required amount by using ambient temperature, rail heater and/or rail puller.
 - (ix) Replace the rail anchors or clips.
 - (x) Weld the joint or apply joint bars:
 - When making an orgothermite field weld, cut out required amount of rail plus the weld width allowance as specified by the weld manufacturer. **(Typically 1”+/-)**.
 - When making an electric flash butt field weld, the amount of rail to be cut is the amount determined from the rail expansion table minus the

amount of rail consumed when making the electric flash butt weld. (Typically 3/4" to 1-1/2").

- (3) All other provisions of Section 3.0 apply to this process.

(c) Procedures for Making Repairs to Buckled Track

- (1) In the event of buckled track, the following conditions exist and procedures are to be used as a guideline:
- (i) Since both rails are assumed to be in compression, cut both rails with a torch.
 - (ii) Make these torch cuts out of the displaced track zone where there may be significant compressive stress in the rails.
 - (iii) Torch cuts shall be at least one rail length (39'+) beyond the end of lateral track displacement.
 - (iv) If possible, before cutting the rail, line the track at the point of displacement in the direction of the displacement to further reduce the compressive stresses in the rail. If the displaced area is near a joint then the joint bars should be removed after lining the track.
 - (v) Misalign the cut and/or uncoupled rail ends, allowing the ends to bypass.
 - (vi) Bring the track back into correct alignment.
 - (vii) Both rails for some distance on either side of the point of maximum displacement and/or the point where rails were cut or the joint bars were removed are now considered to have lost their adjustment.
 - (viii) These rails must be readjusted and/or distressed according to this Section.
 - (ix) Also, see Attachment B: "Recommended Procedures for Distressing Continuous Welded Rail (CWR) Previously Laid In Track": "Reactive or Emergency Distressing".
 - (x) Track buckle at a fixed object:
 - In those cases where the buckle occurs at a fixed object (grade crossing, turnout, etc.) the readjustment/distressing need only take place in the direction away from the fixed object,
 - However, a close inspection of the track on the other side of the fixed object is required to determine if there is any evidence of rail or track movement, rail bunching, etc. which may indicate inadequate adjustment in that area and the need for additional distressing.
 - (xi) If the area cannot be readjusted or repaired before running a train, appropriate remedial action shall be taken:
 - A Form "TD" shall be filled out so that necessary distressing work can be accomplished before return rail temperatures are exceeded (see Attachment C).
 - Alignment measurements should be taken to ensure that the track meets minimum alignment requirements for the Class of Track at which the track is to be returned to service as is shown in the FRA Track Safety Standards §213.55.
 - Rails that have been torch cut during the corrective procedure will be either cut back and/or removed from track promptly (see Attachment B).
 - On MassDOT Rail and Transit Division owned rail lines, torch cut rails shall be protected by a maximum 10 MPH (F&P) temporary slow order (TSO) until the rail is cut back and/or removed from track.

- (xii) New rail adjustment and rail clipping records shall be prepared on the Rail Clipping/Anchoring Form “RC” with the new adjusted temperatures when the rail in the affected area is distressed (see Attachment E).
 - (xiii) The original Form “TD” that was made out at the time of the incident shall be updated to indicate that all necessary repairs, to include distressing, have been made, when the permanent repairs are made.
 - (xiv) The Operating Railroad shall retain Form “RC” for the record for the duration of their Operating Contract and/or until the rail is removed from service. A copy of Form “RC” shall be sent to the MassDOT Rail and Transit Division.
- (d) **Installing Rail Plugs in Existing CWR Track**
- (1) When it is necessary to install rail plugs in existing CWR due to replacement of defective rails, defective field or plant welds, defective joints or insulated joint failures, etc., an approved heating device or hydraulic expander must be used to **assure the amount of rail installed is equal to or less than the length of rail removed. DO NOT ADD RAIL**
 - (2) If the work cannot be completed and a permanent repair cannot be made before running a train, appropriate remedial action shall be taken:
 - (i) A Form “TD” shall be filled out to document work done so that the necessary permanent repair can be accomplished before return rail temperatures are exceeded (see Attachment C).
 - (3) **Where necessary to install a plug rail in CWR, use at least a 14’ long plug in tangent and at least a 21’ plug in curves wherever possible.**
 - (4) See FRA §213.119(c)(3): If it becomes necessary to apply joint bars in CWR already laid in track, because of a service failure or a failed bar with a rail gap present:
 - (i) Weld the joint (The end bolt hole in each rail end must not be drilled to permit field welding);
 - (ii) Replace broken bar(s), replace broken bolts, adjust anchors and within 30 days, weld the joint;
 - (iii) Replace the broken bar(s), replace the broken bolts, install one additional bolt per rail end (six hole bar needs six bolts), and adjust anchors;
 - (iv) Replace the broken bar(s), replace the broken bolts, and anchor every tie 195 feet in both directions from the CWR joint.
- (e) **Field Welding of CWR**
- (1) When field welding joints with orgothermite welds between CWR strings that have been temperature adjusted, or field welding plugs previously installed in properly adjusted CWR track:
 - (i) **The necessary gap for welding will not be developed by allowing the rail gap to open up to the correct welding gap.**
 - (ii) The following welding practices shall be used:
 - Remove the joint bar. Remove with an approved rail saw 1”+/- of rail, or as specified by weld manufacturer, to provide the required welding gap. If a “Wide Gap” field weld is to be used, the gap shall be as required by the weld manufacturer. Torch cutting of rail is prohibited. **DO NOT ADD RAIL**
 - To maintain the proper weld gap apply a hydraulic expander to return the rail ends to the required gap and while holding this position,

proceed to make the weld in accordance with existing procedures. Let field weld cool to 500°F before removing expander.

- Upon completion of weld reapply anchors and/or clips before removal of the hydraulic expander.
- (2) All other provisions contained in §121.1(M), “Field Welding of Rail Joints,” of the MW-1 will be followed when field welding is conducted.

6.0 TRACKWORK THAT DISTURBS CWR TRACK AND THE PROTECTION OF DISTURBED TRACK

6.1 General

The following trackwork repairs are considered to disturb CWR track.

6.1.1 Trackwork that Disturbs CWR

- (a) Trackwork activities discussed below are repairs and/or production work that are considered to have disturbed CWR track.
- (b) **Trackwork activities that disturb CWR track** shall be inspected by a qualified person as designated in FRA §213.7(a)(b)(c).
- (c) Before returning the track to service, the above designated person in (b) shall take appropriate remedial action and place a TSR as given in this Section 6.0.
- (d) The designated qualified person as given in (b) shall place more restrictive TSRs and additional remedial action as conditions warrant.

6.1.2 Trackwork that Does Not Disturb CWR

- (a) **Trackwork activities that do not disturb CWR track** shall be inspected by a qualified person as designated in FRA §213.7(a)(b)(c).
- (b) Before returning the track to service, the above designated qualified person in (a) shall take any appropriate remedial action that that person sees fit to protect the safety of train operations.

6.2 Train Definition

- (a) For the purposes of this part, a train is defined as:
- (1) A locomotive and at least eight loaded ballast cars (80 ton cars each) (1,000 ton +/- consist), or
 - (2) A commuter train with at least five cars and a locomotive (750 ton +/- consist), or
 - (3) Some combination of railroad equipment that is 1,000 ton consist (including locomotive), or
 - (4) A ballast stabilizer that is equivalent to 50 tonnage trains (1,000 tons each) or 50,000 tons, or
 - (5) As approved by MassDOT Rail and Transit Division.

6.3 Work Activities that Disturbs CWR Track

(a) Installation of Plugs in CWR that Disturbs CWR Track:

- (1) If, during the installation of a plug rail in CWR, rail has been added or RNT as determined by measurement of rail gap is less than 95°F or (RNT-10°F) see Attachments A and C and the following:
- (i) Install the rail anchors reversed on field side of plug rail only until necessary permanent repairs are made; or
 - (ii) Spray the elastic fasteners on the gage side in orange paint until necessary permanent repairs are made.
 - (iii) Fill out Track Disturbance Report (Form “TD”). The amount of rail added, as well as the temperature and rail gaps of the rail at the time of the break or

saw cut, **shall** be reported on Form “TD”, “Record of Disturbance of Main CWR Track.”

- (iv) Make temporary and/or permanent repairs as given in Attachment C using tables in Attachment A as required.
- (v) The track shall be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
- (2) **Protective Slow Order:** See Table in Attachment C for maximum rail temperatures (°F) at which permanent repairs or readjustments shall be made and/or slow orders applied. **When these rail temperatures exceeded a TSR of no more than 25F and 25P MPH shall be placed on the track in question until repairs are made, unless inspected daily in the heat of the day, in which case the TSR can be no more than 40F and 40P MPH**
- (3) Repairs shall be accomplished in accordance with Section 5.0 and Attachments C and A.
- (4) Following steps (1) and (2), when permanent repairs have been made, the track will be returned to maximum authorized speed (MAS) unless additional deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.
- (5) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work such as installing plug rails shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
- (b) **Tie Renewal In Tangent Track and in Curves <3° that Disturbs CWR Track:**
 - (1) Installing more than four ties in 39' of track with four undisturbed ties between renewed ties; or
 - (2) Installing four or less than four ties per 39' of track with fewer than four undisturbed ties between renewed ties.
 - (3) In any case no more than four ties per 39' of track (540 ties per mile) can be replaced in one pass.
 - (4) **When old ties are removed, and new ties and plates installed, do not lift the rail.**
 - (5) **When tamping ties installed, tamper should be set so that no lifting of the track occurs.**
 - (6) **MassDOT shall review means, methods, and equipment before ties are removed and installed.**
 - (7) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
 - (8) Ties shall not be installed at ambient temperature of less than 40°F unless approved by the MassDOT Field Representative.
 - (9) Fill out Track Disturbance Report (Form “TD”).
 - (10) The track shall be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (11) **Protective Slow Order (without stabilizer) (Ambient ≤80°F):** Not to exceed 25F and 30P MPH shall be applied for a period of 24 hours and a minimum of 12 trains over the affected track.
 - (12) **Protective Slow Order (with stabilizer) (Ambient ≤80°F):** Not to exceed 25F and 30P MPH shall be applied for the first train over the affected track.

- (13) **Protective Slow Order (with or without stabilizer) (Ambient >80°F):** If ambient temperature >80°F and rail temperature is >110°F, a slow order of 10F and 15P shall be applied until the ambient temperature drops to 80°F. When the ambient temperature is ≤80°F, the Protective Slow Order applied is described as above in (11) or (12).
 - (14) Following steps (11) and/or (12), (13), track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.
- (c) **Tie Renewal in Curves ≥3° that Disturbs CWR Track:**
- (1) In addition to the protective action required when installing ties in tangent track in Paragraph (b) above, if 540 ties per mile or more are installed in curves ≥3° the following shall be done:
 - (i) The curve or curves ≥3° in question shall be staked as described in Attachment E, using Form "TM," Report of Track Movement.
 - (ii) Movement of the curve(s) when ties are installed shall be recorded on Form "TM"; and,
 - (iii) If a curve greater or equal to 3° moves inward and/or outward when installing ties, the curve shall be inspected by a person qualified under FRA §213.7(a)(b)(c), and appropriate remedial action taken as conditions warrant.
 - (iv) If movement limits to the inside of the curve are exceeded then the RNT shall be adjusted by distressing the rail in the curve and/or lining the curve out (see Attachment B).
 - (2) **When old ties are removed, and new ties and plates installed, do not lift the rail.**
 - (3) **When tamping ties installed, tamper should be set so that no lifting of the track occurs.**
 - (4) **MassDOT shall review means, methods, and equipment before ties are removed and installed.**
 - (5) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
 - (6) Ties shall not be installed at ambient temperature of less than 40°F unless approved by the MassDOT Field Representative.
 - (7) Fill out Track Disturbance Report (Form "TD") and Report of Track Movement (Form "TM") as appropriate.
 - (8) **Protective Slow Order (with or without stabilizer) (Ambient ≤80°F):** Same as for Tie Renewal in Tangent Track if curve movement for curves ≥3° is less than 3" as given on the table for Form "TM" (see Attachment E for table).
 - (9) **Protective Slow Order (without or with stabilizer) (Ambient >80°F):** If ambient temperature is >80°F and rail temperature is >110°F, a slow order of 10F and 15P MPH shall be applied until the ambient temperature drops below 80°F. When the temperature drops below 80°F, the Protective Slow Order is applied as described above in (8).
 - (10) **Protective Slow Order for Curve Movement (with or without stabilizer) (Ambient ≤80°F):** If a curve ≥3° has movement ≥3" to the inside (see Form "TM," Attachment E), a protective slow order not to exceed 25F and 30P shall be applied. In addition:

- (i) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (ii) The restriction shall remain in effect until the curve is lined out back to its original position and/or both rails are readjusted to the target neutral temperature of 105°F in accordance with Section 3.0 and Attachment B
 - (11) **Protective Slow Order for Curve Movement (with or without stabilizer) (Ambient >80°F):** If a curve $\geq 3^\circ$ has movement $\geq 3"$ to the inside (see Form "TM," Attachment E), a protective slow order not to exceed 10F and 15P shall be applied. In addition:
 - (i) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (ii) The slow order of 10F and 15P MPH shall be applied until the ambient temperature drops below 80°F. When the temperature drops below 80°F, the protective slow order is applied as described above in (10); and
 - (iii) The restriction of 25F and 30P shall remain in effect until the curve is lined out back to its original position and/or both rails are readjusted to the target neutral temperature of 105°F in accordance with Section 3.0 and Attachment B.
 - (12) Following steps (7) through (11), track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.
- (d) **Surfacing, Smoothing and/or Lining that Disturbs CWR Track (Tangent and Curves <3°):**
- (1) **The normal balancing of throws done during high speed surfacing operations does not constitute out-of-face curve realignment.**
 - (2) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
 - (3) If the ambient temperature and/or rail temperature is less than 40°F, all work will be suspended unless it is an emergency or directed by the MassDOT Field Representative.
 - (4) **Protective Slow Order:** The protection of CWR Track which has been surfaced is shown in the following table, "Protection Required for CWR Track Surfaced Based on Air and Rail Temperatures."
 - (5) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (6) When operating speeds change during the time a restriction (TSR) is in effect, the worked track must be re-inspected by a qualified Operating Railroad Employee each time the speed is to be raised.
 - (7) Whenever a dynamic stabilizer is to be used as part of a surfacing operation, it will be:
 - (i) Operated after each pass of the tamper; and
 - (ii) Both vibration units must be fully operable and the frequency of oscillation shall be in the range of 30-35 Hz, with a minimum vertical loading pressure of 870-1,000 psi and working speed shall be in the range of 1-2 MPH.
 - (iii) A ballast compactor may be used if approved by MassDOT Rail and Transit Division.

**Protective Slow Order Required for CWR Track Surfaced
Based on Air and Rail Temperatures**

Air Temperature	Distance	Wood Tie Track Protection	Concrete Tie Track Protection
Applies to ALL Surfacing: STOP Work			
Ambient Does Exceed 80° or the and Rail Temperature Exceeds 110°F***	All Distances	STOP Work	STOP Work
Protections to be applied for Surfacing with NO Dynamic Stabilizer			
Ambient Does Not Exceed 80° (Rail Temp ≤110°F)	0 ft. to 19'-6" Over 19'-6"	None* 25F-30P MPH for 24 hours <u>and</u> the passage of 12 trains	None* 25F-30P MPH for 24 hours <u>and</u> the passage of 12 trains**
In an Emergency, Ambient Does Exceed 80° (Rail Temp >110°F)	All Distances Ambient >80°F All Distances Ambient ≤80°F	10F-15P MPH until ambient temperature ≤80°F 25F-30P MPH for 24 hours <u>and</u> the passage of 12 trains	10F-15P MPH until ambient temperature ≤80° 25F-30P MPH for 24 hours <u>and</u> the passage of 12 trains**
Protections to be applied for Surfacing USING a Dynamic Stabilizer			
Ambient Does Not Exceed 80° (Rail Temp ≤110°F)	All Distances WITH the use of a Dynamic Stabilizer	10F-15P MPH for the first train 25F-30P MPH for the second train, Then Normal Speed	10F-15P MPH for the first train 25F-30P MPH for the second train, Then Normal Speed
In an Emergency, Ambient Does Exceed 80° (Rail Temp >110°F)	All Distances WITH the use of a Dynamic Stabilizer	10F-15P MPH first train 25F-30P MPH for the second train, Then not more than 40F-60P MPH for the passage for 24 hours and 12 additional trains	10F-15P MPH first train 25F-30P MPH for the second train, Then not more than 40F-60P MPH for the passage for 24 hours and 12 additional trains
<p>* If the air temperature does exceed 80°F (rail temperature exceeds 110°F) during the 24 hours following the work then a 25F-30P MPH restriction must be placed on the worked area for 24 hours and the passage of 12 trains.</p> <p>** A restriction with a speed no greater than 40F-60P MPH may be applied only if a Shoulder and Crib Compactor is used immediately after surfacing. If a restriction greater than 25F and 30P MPH is applied, the first train over the affected area must be limited to 25F and 30P MPH.</p> <p>***If the air temperature exceeds 80°F and the rail temperature exceeds 110°F, there is no work permitted except in an emergency or as directed by MassDOT Rail and Transit Division.</p>			

- (e) **Surfacing, Smoothing and/or Lining that Disturbs CWR Curved Track: Curves $\geq 3^\circ$:**
- (1) **The normal balancing of throws done during high speed surfacing operations does not constitute out-of-face curve realignment.**
 - (2) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
 - (3) If the ambient temperature and/or rail temperature is less than 40°F, all work will be suspended unless it is an emergency or directed by the MassDOT Field Representative.
 - (4) Curves 3° or over being surfaced and aligned shall be staked to monitor movement.
 - (i) To stake a curve, place reference points uniformly around the curve in the track along the gage side of the high rail, starting at the tangent to spiral point (TS). As a minimum, tag and stake the following points:
 - Tangent to Spiral Point (TS)
 - Spiral to Curve Point (CS)
 - Full Body of Curve: at least every 200'
 - Curve to Spiral Point (CS)
 - Spiral to Tangent Point (TS)
 - (ii) The reference points shall be 200' or less apart. Each reference point around the curve shall be staked on the field side of the high rail (where possible). Stakes should be set a minimum of 15' from the gage corner side of the high rail out of the way of ballast unloading and the ballast regulator wings.
 - (iii) The reference points are to be recorded on Form "TM," "Report of Track Movement" (see Attachment E).
 - (iv) Measure from the reference points to the stakes on the field side of the high rail to obtain initial values of distance between reference points and stakes before any work is conducted and record on Form "TM".
 - (v) The reference point to stake distances shall be re-measured immediately after the final surfacing pass by the surfacing gang. These measurements are made to determine track movement, if any, at the reference points. The measurements shall be measured and recorded on Form "TM" before track is returned to normal speed.
 - (vi) In addition, the track movement at the reference points should also be re-measured seven days after the work is completed.
 - (vii) Track movements shall be calculated and compared to the values given on Form "TM" (see Attachment E).
 - (5) **Protective Slow Order (any temperature):** If in surfacing and aligning a curve $\geq 3^\circ$, the limits of out-of-face curve realignment given in Attachment E, Form "TM", are NOT EXCEEDED:
 - (i) If the curve is moving outward and/or inward, inspect the curve with a person qualified under FRA §213.7(a)(b)(c), and provide protection and/or TSRs as given in Section 6(d), "Surfacing, Smoothing and/or Lining that Disturbs CWR Track (Tangent and Curves $< 3^\circ$)"; or
 - (ii) If the curve is moving outward and/or inward, inspect the curve with a person qualified under FRA §213.7(a)(b)(c), and, if conditions warrant, take

remedial action and provide more restrictive protection than required in Section (6)(d), "Surfacing, Smoothing and/or Lining that Disturbs CWR Track (Tangent and Curves $<3^\circ$)."

- (6) **Protective Slow Order (when curve movements in Attachment E, Form "TM", are exceeded):** If in surfacing and aligning a curve $\geq 3^\circ$, the limits of out-of-face curve realignment (≥ 3 ") given in Attachment E, Form "TM" are exceeded (≥ 3 "), proceed as follows.
- (i) Fill out Form "TD" Track Disturbance Report and Form "TM" Report of Track Movement.
 - (ii) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (iii) The curve will have been considered to have lost its neutral temperature and will have to be adjusted in accordance with Section 3.0, "Installation and Adjustment of CWR" and/or realigned out to original position as determined by staking.
 - (iv) **Protective Slow Order (Ambient $\leq 80^\circ\text{F}$):** Not to exceed 25F and 30P MPH until rail has been cut and RNT adjusted to 105°F and/or curve has been lined out to original position.
 - (v) **Protective Slow Order (Ambient $>80^\circ\text{F}$):** Not to exceed 10F and 15P until:
 - The ambient temperature drops below 80°F . When the temperature drops below 80°F , the protective slow order is applied as described above in (iv) above; and.
 - The restriction of 25F and 30P shall remain in effect until the curve is lined out back to its original position and/or both rails are readjusted to the target neutral temperature of 105°F in accordance with Section 3.0 and Attachment B
- (7) Following steps (4) through (6), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

(f) **Cut and Throw of Track that Disturbs CWR Track:**

- (1) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
- (2) When existing CWR track is cut and thrown, it will be considered to have lost its neutral temperature and will have to be adjusted in accordance with Section 3(b). **DO NOT ADD RAIL.**
- (3) Fill out Track Disturbance Report (Form "TD").
- (4) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
- (5) **Protective Slow Order (Ambient $\leq 80^\circ\text{F}$):** Not to exceed 25F and 30P MPH shall be applied until RNT is readjusted to 105°F .
- (6) **Protective Slow order (Ambient $>80^\circ\text{F}$):** Not to exceed 10F and 15P MPH until RNT is readjusted to 105°F .
- (7) The area of cut and throw will have been considered to have lost its neutral temperature and the RNT shall be adjusted in accordance with Section 3.0, "Installation and Adjustment of CWR."
- (8) RNT adjustments shall be made before the ambient and rail temperatures reach those given in (1).

- (9) Following steps (3) through (8), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.
- (g) **Switch or Track Panel Installation that Disturbs CWR Track:** When performing panel installation, the following requirements apply:
- (1) Fill out Track Disturbance Report (Form "TD").
 - (2) Switch and track panel installation shall only be performed at ambient temperatures greater than 30°F unless it is an emergency or as directed by MassDOT Rail and Transit Division; and,
 - (3) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
 - (4) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (5) The area of switch or track panel installation will have been considered to have lost its RNT if:
 - (i) Rail has been added when the switch and track panel has been installed.
 - (ii) This can be determined by placing match mark on the rail before the track is cut to install the switch and/or track panel and by measuring the rail gap.
 - (6) If RNT has been lost, the rail shall be adjusted to a target RNT of 105°F in accordance with Section 3.0, "Installation and Adjustment of CWR."
 - (7) If rail has been added, a protective slow order shall be placed until the adjacent CWR and RNT is adjusted. These RNT adjustments shall be made before the ambient and rail return temperatures are exceeded as given in Attachment C. These temperatures are related to the rail temperature at which the rail was cut to install the track or switch panel.
 - (8) **Protective Slow Order (Ambient $\leq 80^{\circ}\text{F}$) (until rail neutral temperature adjustment):** Not to exceed 25F and 30P shall be applied until the RNT adjustment work is accomplished.
 - (9) **Protective Slow Order (Ambient $> 80^{\circ}\text{F}$) (until rail neutral adjustment):** Not to exceed 10F and 15P MPH shall be applied until the RNT adjustment work is accomplished.
 - (10) In addition, the track panel has lost all its lateral stability and the CWR is considered disturbed until the ballast section is restored and recompacted/stabilized by machine action and/or by train traffic.
 - (11) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast without stabilizer):** Place a protective slow order not to exceed 25F and 30P MPH will be applied after surfacing, for a period of 24 hours and a minimum of 12 trains over the affected track.
 - (12) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast with stabilizer):** Not to exceed 25F and 30P MPH shall be placed for a period of 24 hours and a minimum of three trains over the affected track if a stabilizer has been used.
 - (13) Following steps (4) through (12), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.
- (h) **Undercutting that disturbs CWR track:** When performing this work, the following requirements apply:
- (1) Fill out Track Disturbance Report (Form "TD").

- (2) Undercutting shall not be done at an ambient temperature below 30°F and above 80°F (rail temperature greater than a temperature of 110°F) except in an emergency and as approved by MassDOT Rail and Transit Division.
 - (3) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (4) When undercutting track, the neutral temperature shall be considered lost and the rail will have to be adjusted to a target RNT of 105°F in accordance with Section 3.0, "Installation and Adjustment of CWR."
 - (5) These RNT adjustments shall be made before the ambient and rail return temperatures are reached as given in Attachment C. These temperatures are related to the rail temperature at which the rail was undercut and the existing RNT was substantially altered.
 - (6) **Protective Slow Order (Ambient \leq 80°F) (until rail neutral temperature adjustment):** Not to exceed 25F and 30P shall be applied until the RNT adjustment work is accomplished.
 - (7) **Protective Slow Order (Ambient $>$ 80°F) (until rail neutral adjustment):** Not to exceed 10F and 15P MPH shall be applied until the RNT adjustment work is accomplished.
 - (8) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast without stabilizer):** Place a protective slow order not to exceed 25F and 30P MPH will be applied after surfacing, for a period of 24 hours and a minimum of 12 trains over the affected track.
 - (9) **Protective Slow Order (at any ambient Temperature) (with correct RNT) (to consolidate ballast with stabilizer):** Not to exceed 25F and 30P MPH shall be placed for a period of 24 hours and a minimum of three trains over the affected track if a stabilizer has been used.
 - (10) Following steps (3) through (9), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.
- (i) **Out-of-Face Shoulder Ballast Cleaning that Disturbs CWR Track:**
- (1) Fill out Track Disturbance Report (Form "TD").
 - (2) Out-of-Face shoulder ballast cleaning shall not be done at an ambient temperature below 30°F and above 80°F (rail temperature greater than a temperature of 110°F) except in an emergency and as approved by MassDOT Rail and Transit Division.
 - (3) After shoulder ballast cleaning is performed, there shall be a full restoration of the standard ballast section to include cribs and shoulders.
 - (4) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (5) **Protective Slow Order (with compactor and/or stabilizer) (Ambient Temperature \leq 80°F):** The track may be put back at MAS provided that:
 - (i) The first train shall operate after out-of-face shoulder ballast cleaning at no more than 25F and 30P MPH.
 - (ii) The Operating Railroad person qualified under FRA §213.7 shall re-inspect the track and if no deficiencies are found; and
 - (iii) The track has a fully restored standard ballast section that has been treated with:
 - A standard ballast compactor and/or;

- A dynamic stabilizer.
- (iv) The track shall be returned to MAS.
- (6) **Protective Slow Order (without compactor and/or stabilizer) (Ambient Temperature $\leq 80^{\circ}\text{F}$):** If ballast compaction is not performed with a standard ballast compactor and/or a dynamic stabilizer:
 - (i) The track shall have a protective slow order of no more than 25F and 30P MPH for 24 hours. for a period of 24 hours **and** a minimum of 12 trains over the affected track.
 - (ii) The Operating Railroad person qualified under FRA §213.7 shall re-inspect the track and if no deficiencies are found;
 - (iii) The track speed shall be returned to MAS.
- (7) **Protective Slow Order (with compactor and/or stabilizer) (Ambient $>80^{\circ}\text{F}$):** In an emergency, if the ambient temperature exceeds 80°F (rail temperature $>110^{\circ}\text{F}$), out-of-face shoulder ballast cleaning shall continue only if a shoulder compactor and/or dynamic stabilizer is used. A protective slow order shall be placed as follows:
 - (i) Wood or concrete tie track: not to exceed 25F and 30P MPH during the period the air temperature exceeds 80°F and/or until 24 hours elapses then re-inspect and return to MAS, if appropriate.
- (j) **CWR Installation that is Unacceptable:**
 - (1) Fill out Track Disturbance Report (Form "TD")
 - (2) CWR not installed in compliance with Section 3.0.
 - (3) A protective slow order not to exceed 25F and 30P MPH until the CWR is installed and adjusted to the target neutral temperature of 105°F as per Section 3.0.
- (k) **Anchor or Clip Removal that Disturbs CWR Track:**
 - (1) When more than eight ties per 39' of track have anchors or clips removed and/or missing; or,
 - (2) The required standard anchor pattern as in Section 4.0 does not exist, CWR track is disturbed; and
 - (3) Fill out Track Disturbance Report (Form "TD")
 - (4) **Protective Slow Order (Ambient $>80^{\circ}\text{F}$):** If anchor/clip replacement is not accomplished before the ambient temperature exceeds 80°F (rail temperature $>110^{\circ}\text{F}$), a slow order not to exceed 25F and 30P MPH and shall be in effect until the proper number of anchors or clips are applied and/or re-applied in the pattern as described in Section 4.0.
 - (5) Install all missing anchors and/or clips.
 - (6) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
 - (7) Following steps (3) through ((6), the track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.
- (l) **Cribbing that Disturbs CWR Track:**
 - (1) Cribbing more than three ties in a row in 39'; or
 - (2) Cribbing four or more ties with less than four undisturbed ties between ties cribbed.

- (3) In all cases no more than three successive ties or more than four ties per 39' of track can be cribbed in one pass.
- (4) Track with the cribs reduced in the rail seat area for the mechanical installation of rail anchors on properly adjusted CWR does not require a slow order for improper ballast section, if this is the only ballast section deficiency and the track has not had lateral resistance reduced.
- (5) If the ambient temperature is greater than 80°F (rail temperature greater than a neutral temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division.
- (6) Fill out Form "TD" Track Disturbance Report.
- (7) The track must be inspected by a person qualified under FRA §213.7 to ensure that the track is safe for the passage of the first train.
- (8) Wood or concrete tie track will be returned to service:
 - (i) When all the cribs are filled with new ballast and dressed and mechanically tamped.
- (9) **Protective Slow Order (at any ambient temperature):** Not to exceed 25F and 30P MPH for a period of 24 hours and the passage of 12 trains over the affected track, re-inspect and return track to MAS, as appropriate.
- (10) Following steps (6) through (9), track will be returned to MAS unless deficiencies or defects are observed and then appropriate remedial action shall be taken in accordance with FRA Part 213.

6.4 Suspension of Work Due to Heat Where Ambient Temperature >80°F or Rail Temperature >110°F

- (a) The following work which can reduce the stability of CWR at higher temperatures will be suspended (except under a continuous track outage) or unless there is an emergency, when air temperatures are expected to be above 80°F (rail temperature greater than a rail temperature of 110°F):
 - (1) Tie Renewal
 - (2) Tie Renewal in Curves
 - (3) Surfacing, Smoothing and/or Lining
 - (4) Out-of-face Curve Re-aligning
 - (5) Cut and Throw of Track
 - (6) Installation of Track or Switch Panels
 - (7) Undercutting
 - (8) Out-of-Face Shoulder Ballast Cleaning
 - (9) Cribbing

6.5 Protection of Work Areas for Latent Heat Effects

- (a) **This requirement applies for work that has been done that disturbs CWR track until seven days of traffic has been accumulated over the work area, or the period of high heat ends.**
- (b) The speed restriction shall be placed by a person qualified on FRA §213.7(a)(b)(c), if appropriate, on a case-by-case basis if the air temperature is at 80°F or above (rail temperature >110°F).
- (c) Each Operating Railroad qualified employee in a work block is responsible for the protection and inspection requirements of this Section, as they relate to the work conducted under the railroad's control.

- (d) In the case where a Foreman is working in an out-of-service block of track under the control of another Foreman, but at a separate location from the Foreman providing protection:
 - (1) This Foreman will inspect and report the findings, if any, to the Foreman in charge of the track before reporting clear of the track.
 - (2) This report must include any required speed restrictions and any other information that would affect the safe movement of trains.

7.0 SPECIAL INSPECTIONS OF CWR TRACK

(a) Special Inspection in Hot Weather

- (1) When the air temperature is $\geq 95^{\circ}\text{F}$ or the rail temperature is $\geq 125^{\circ}\text{F}$, all main tracks with CWR shall be inspected by qualified Operating Railroad personnel qualified on Track Safety Standards, Part 213, §213.7(a)(b)(c) and in accordance with currently established inspection procedures, outlined in this Appendix.
- (2) During periods of extreme heat, when air temperatures exceed 95°F or the rail temperature is $\geq 125^{\circ}\text{F}$, the Operating Railroad qualified employee should make Special Inspections and place appropriate speed restrictions (TSR) and take remedial action, as required.
- (3) Determination of Temperature: The rail temperature is the preferred temperature and is taken with an approved rail thermometer. The air temperature is as reported by the National Weather Service.
- (4) Operating Railroad personnel shall make out a "Special Track Inspection Report" (see Appendix F, "Forms") for this inspection and retain a copy for the duration of the Operating Contract that can be reviewed by the MassDOT Rail and Transit Division.
- (5) During this inspection, the track inspector must be particularly alert for wavy track, longitudinal rail movement, kinked joints in compression and evidence of lateral track movement. The track inspector must also be aware that the following conditions increase the possibility of buckling:
 - (i) Recently worked track
 - (ii) Fouled ballast and mud spots
 - (iii) Gaps in the ballast at the ends of the ties indicating tie movement
 - (iv) Existing deformations in line and surface
 - (v) Rail canting and/or lifting out of the tie plates
 - (vi) Shiny marks on the base of the rail indicating that the rail is sliding through the anchors and/or clips
 - (vii) Kinky or wavy rail
 - (viii) Bottom of sag curves
 - (ix) In areas of heavy braking and acceleration
 - (x) Higher degree curves
 - (xi) Fixed facilities (i.e., turnouts, road crossings, bridges, etc.)
 - (xii) Sub-standard ballast section
 - (xiii) Sub-standard anchor/clip pattern
 - (xiv) Sub-standard tie conditions
- (6) If track is identified as having any conditions which indicate the possibility of buckling, remedial action must be taken immediately by Operating Railroad personnel qualified in FRA §213.7(a)(b)(c).

(b) Special Inspection in Cold Weather

- (1) When the air temperature or the rail temperature is $\leq 10^{\circ}\text{F}$, all main CWR and jointed tracks will be inspected by qualified Operating Railroad personnel in accordance with currently established inspection procedures, outlined in this Appendix.
- (2) Determination of Temperature: The rail temperature is the preferred temperature and is taken with an approved rail thermometer. The air temperature is as reported by the National Weather Service.
- (3) Operating Railroad personnel shall make out a "Special Track Inspection Report" (see Appendix F, "Forms") for this inspection and retain a copy for the duration of the Operating Contract that can be reviewed by the MassDOT Rail and Transit Division.
- (4) Inspectors will inspect, at a minimum, for:
 - (i) Broken rails
 - (ii) Canted rails out of the plates on curves
 - (iii) Bent bolts
 - (iv) Pull-aparts
 - (v) Broken welds
 - (vi) Wide gap between rail ends
 - (vii) Cracked or broken joint bars (conventional and insulated)
 - (viii) Curve movement to the inside

(c) Semi-Annual Inspections

- (1) A Spring inspection, between April 1 and May 30 (before air temperature of 80°F or a rail temperature of 110°F), and a Fall inspection between October 15 and November 15, shall be made by walking or by a hi-rail on all CWR main track. This inspection shall be made using the "Report of Semi-Annual Inspection of CWR Track" found in Attachment E. The Inspection shall be made by a Manager of the Operating Railroad qualified under FRA §213.7(a)(b)(c).
- (2) The inspection will concentrate on compliance with standards in the following areas:
 - (i) Anchor pattern
 - (ii) Anchor position
 - (iii) Resilient fasteners
 - (iv) Tie condition
 - (v) Ballast condition
 - (vi) Ballast section
 - (vii) Joint condition
 - (viii) Evidence of longitudinal rail movement, particularly at fixed locations, such as turnouts and grade crossings and open deck bridges.
 - (ix) Drainage condition
 - (x) Overall roadbed stability
 - (xi) Curve movement
 - (xii) Alinement deviations

- (3) The Operating Railroad Manager will, within 30 days from the completion of the inspection, submit inspection information to the MassDOT Rail and Transit Division. Some of the information to be included is:
 - (i) A report of the special inspection that identifies track inspected by number and milepost limits;
 - (ii) The name of the individuals inspecting;
 - (iii) Date inspected;
 - (iv) Any exceptions found; and
 - (v) Protective and corrective action identified.
- (d) **Protection of CWR Track with Deficiencies**
 - (1) When making Special Inspections (Hot and Cold Weather), Bi-Annual Inspections (Spring and Fall) and/or regular scheduled inspections in CWR track, if any of the above conditions described above in this paragraph are found to exist:
 - (i) Remedial action shall be taken, if required, as per FRA §213.5 by an individual qualified as per FRA §213.7(a)(b)(c).
 - (2) It is extremely important that noted deficiencies be corrected before the air temperature is expected to be above 80°F or the rail temperature expected to be above 110°F.
 - (3) If deficiencies are not corrected before the air temperature is expected to be above 80°F or the rail temperature above 110°F, appropriate remedial action shall be taken as per FRA §213.5, by an individual qualified as per FRA §215.7(a)(b)(c), if warranted.
 - (4) Determination of Temperature: The rail temperature is the preferred temperature and is taken with an approved rail thermometer. The air temperature is as reported by the National Weather Service.

8.0 JOINTS IN CWR TRACK

8.1 New Installations of CWR

- (a) Joints in CWR track when installing CWR:
 - (1) When a joint or joints are installed in CWR during installation of CWR, one of the following actions per FRA 213.119(c)(2) shall be undertaken within 60 days:
 - (i) Weld the joint;
 - (ii) Install additional bolts in the joint bar so that all holes (6 holes) in the bar contain a bolt; or
 - (iii) Fully box anchor every tie for 195' in both directions from the joint.

8.2 Service Failures in Existing Previously Installed CWR

- (a) Bolted joints in existing CWR that experience a service failure:
 - (1) In the case of a bolted joint in CWR experiencing service failure or a failed bar with a rail gap present, within 30 days either of the following actions per FRA 213.119(c)(3) shall be taken:
 - (i) Weld the joint;
 - (ii) Replace the broken bar(s), replace the broken bolts, adjust the anchors and, within 30 days, weld the joint;
 - (iii) Replace the broken bar(s), replace the broken bolts, install one additional bolt per rail end, and adjust anchors.
 - (iv) Replace the broken bar(s), replace the broken bolts, and anchor every tie 195' in both directions from the CWR joint; or

- (v) Replace the broken bar(s), replace the broken bolts, add rail with provisions for later adjustment pursuant to FRA §213.119(d)(2) and reapply anchors.

8.3 Service Failure of Joint Bars and/or Track Bolts in a CWR Joint

- (a) Minimum remedial action required:
 - (1) In the event of:
 - (i) Cracked or broken joint bar or bars, and
 - (ii) Bent and/or broken joint bolt or bolts,
 - (iii) Take the appropriate minimum remedial action given below and as shown in Attachment D, "Joint Defect Guidelines/Maximum Allowable Temporary Speed Restrictions (TSRs)".
- (b) Number of bolts in rail ends required:
 - (1) In CWR track each rail end shall be bolted with at least two bolts at each bolted joint used to connect CWR strings, or CWR strings to conventional rail.
 - (2) Where either of the following conditions are found to exist, the track must be protected by the appropriate remedial action until the condition is corrected:
 - (i) Less than two bolts, but at least one bolt in a rail end: fix or place a TSR of no more than 10F/15P MPH until repaired.
 - (ii) One rail end unbolted (see Attachment D).
 - (3) Each joint bar must be held in position by track bolts or fasteners, and tightened sufficiently to provide support for abutting rail ends.
 - (4) When no-slip, or joint-to-joint rail contact exists by design; these locations are considered to be CWR track, and must meet all the requirements for CWR in this Appendix.
- (c) Cracked or broken joint bars (see Attachment D):
 - (1) If a joint bar is cracked, broken or because of wear allows vertical movement of either rail when all bolts are tight, it shall be replaced.
 - (2) If a joint bar is cracked between the middle two bolt holes it shall be replaced.
 - (3) If between the middle two bolt holes, both joint bars are found to be cracked or one joint bar is found to be broken entirely through, trains may not be operated and the track taken out of service (see Attachment D) until the joint bars are replaced.
 - (4) If both joint bars are found to be broken entirely through between the middle two bolt holes, trains may not be operated and the track taken out of service (see Attachment D) until the joint bars are replaced.
- (d) Opening (gap) of joints in CWR (see Attachment D):
 - (1) Bolted Rail Ends (Both Ends): The gap between rail ends shall be less than 1-1/2". If a joint is found to be open 1-1/2", a maximum 25F and 30P MPH temporary speed restriction shall be applied if there are two effective bolts in each rail end.
 - (2) Bolted Rail Ends (One End): If the gap between the rail ends is 1-1/2" but less than 2", a person designated under FRA §213.7(a)(b)(c)(d), shall visually supervise each train move. Repair the joint within 24 hours.
 - (3) Bolted Rail Ends (One End): If the gap between the rail ends is greater than 2" but 4" or less, a person designated under FRA §213.7(a)(b)(c)(d) shall visually supervise each train move. Repair the joint within 24 hours.
 - (4) Bolted Rail Ends (One End): If the gap between the rail ends is 4" or greater, the track shall be taken out of service until the joint is repaired.

8.4 Inspection of Joints In CWR Track

- (a) Joints in CWR track must be inspected on foot according to §213.119. Rail joints in CWR track within turnouts, track crossings, expansion joints or lift rail assemblies need not be inspected during the walking inspection as they shall be inspected monthly in accordance with §213.235.
- (b) The limits of the turnout for the purpose of this part are defined as a point 50 feet in advance of the points to the last long timber, or the heel of the frog if weave timbers are found at the heel.
- (c) The limits of a track crossing, expansion joint, or lift rail assembly will be any joint within 20 ft. of the device.
- (d) This inspection results shall be recorded on the Operating Railroad's Turnout Inspection Form.
- (e) During walking inspections of joints in CWR particular attention must be paid to the following conditions of the joint and the track surrounding the joint:
 - (1) Cracks in the joint bar
 - (2) Evidence of movement of the bars in relation to the rail ends in the fishing areas ("loose" joints)
 - (3) Loose, bent or missing joint bolts
 - (4) Rail end batter
 - (5) Rail end mismatch
 - (6) Track surface, particularly hanging ties at the joint
 - (7) Evidence of excessive longitudinal movement of rail noted by the displacement of rail anchors, or "polished" areas at the ends of the bars or at rail anchors or clips
- (f) All requirements per FRA Part 213 applying to Gage, Track Surface, Crossties, Defective Rails, Rail End Mismatch, Rail Joints, Rail End Batter, Tie Plates, and Rail Fasteners still apply. If there is a combination of conditions that substantially increases the chance of a broken joint bar an appropriate speed restriction should be applied.

8.4.1 Embedded Joints

- (a) Permanently Embedded Joints:
 - (1) Where embedded joints exist, it is not necessary to disassemble or remove the track structure (e.g., remove pavement or crossing pads), to conduct an inspection of CWR joints unless there a deficiency or defect is suspected. Every effort must be made to inspect the visible portions of the joint bar and/or joint in embedded track construction.
 - (2) In new construction there shall be no embedded joints without the permission of the MassDOT Rail and Transit Division.
- (b) Temporarily Embedded Joints:
 - (1) Joints may be embedded in a temporary crossing.
 - (2) Every effort should be made to keep the joint bar visible for inspection through the use of flangeway protection such as timbers, etc.

8.4.2 Joint Inspection in CWR

- (a) Each joint in CWR shall be identified by using:
 - (1) Route;
 - (2) Track designation;
 - (3) Milepost;
 - (4) Joint type;
 - (5) Rail designation; or
 - (6) Other information so that the joint can be identified in the field.
- (b) The Operating Railroad Company will maintain a computer-based inventory of each joint and furnish a copy to MassDOT Rail and Transit Division annually. The annual report shall also include the past five years of data as developed by the Operating Railroad Company.
- (c) Each time a joint is removed from track by welding and/or is removed by the installation of rail that eliminates the joint, a Report of Joint Elimination by Field Welding shall be filled out (see Attachment E). The disposition of joints in track removed shall be noted on the next report when inspecting joints in CWR. By doing this, joints in CWR are reported from the time they are introduced until the time they are removed from track.
- (d) The joint inventory will not contain those joints considered part of a turnout, track crossing, expansion joint, or lift rail assembly as the inspection of these joints is contained on the Monthly Switch Inspection Form as per §213.235.

8.4.3 Record of Inspections

- (a) Each walking inspection of a joint in CWR track shall be recorded on the Operating Railroad Company's Special Track Inspection Report.
- (b) The information on the Form shall include at a minimum, the Joint Identification Number, the route, the track, the milepost, the rail type, and any defects that require a remedial action and/or a permanent repair.

9.0 TRAINING

- (a) To be considered qualified under §213.7 to supervise or conduct the installation, maintenance, adjustment and inspection of CWR track; individuals will receive instruction in, and be tested on, the **Operating Railroad's Approved CWR Plan**.
- (b) All Operating Railroad MW employees responsible for the inspection, installation, adjustment, or maintenance of CWR track must successfully complete training on the Operating Railroad's Approved CWR Plan every calendar year.
- (c) In addition, Operating Railroad MW employees shall be provided with a copy of these procedures which they shall make available at any CWR job site, if requested.
- (d) The Operating Railroad shall maintain a list of those employees qualified to supervise restorations and inspect track in CWR territory. The Operating Railroad shall make this list available upon request.
- (e) Annual CWR training programs will address the following:
 - (i) The Operating Railroad's Approved CWR Plan and the application of written CWR procedures issued by the Operating Railroad.
 - (ii) The qualification and designation of the Operating Railroad's MW personnel to:
 - Know and understand the requirements of the Operating Railroad's CWR Plan; and
 - Have the ability to detect deviations from the Operating Railroad's CWR Plan; and

- Can prescribe appropriate remedial action when deviations are discovered from the Operating Railroad's CWR Plan; and
 - Have written authorization from the Operating Railroad to prescribe remedial action and/or make necessary repairs.
- (iii) Subjects to be discussed during the annual training on the Operating Railroad's CWR Plan include, but are not limited to, the following:
- Installation and Adjustment of CWR
 - Anchoring of CWR
 - Maintenance of Desired Rail Neutral Temperature in Previously Installed CWR
 - Trackwork That Disturbs CWR Track and Protection of Disturbed Track
 - Special Inspections of CWR Track
 - Joint Inspections in CWR Track
 - Training
 - Record Keeping

10.0 REPORTING REQUIREMENTS FOR CWR TRACK

(a) Report of Disturbance of CWR Track (Form "TD") (Attachment E)

- (1) When any maintenance operations are considered to have disturbed CWR track as per Section 6.0, or if any rail is cut in CWR track or a service failure occurs in CWR track, a "Report of Track Disturbance", Form "TD", will be filled out by the Operating Railroad.
- (i) Part A of this Form shall be completed for any work listed in Section 6.0 above which causes the CWR track to be considered disturbed.
 - (ii) Part B shall be completed whenever there is a Service Failure or CWR in main track is cut or broken for any reason.
 - (iii) The "Report of Track Disturbance Form" with instructions is found in Attachment E.
 - (iv) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the MassDOT Rail and Transit Division.

(b) Report of Track Movement (Form "TM") (Attachment E)

- (1) During out-of-face surfacing operations and/or the out-of-face installation of ties, the neutral temperature can be adversely affected on curved track. The track may be line in and/or the track may pull in due to reduced longitudinal and lateral resistance of the track structure.
- (i) For curves of 3° and greater, a "Report of Track Movement, Form "TM" shall be made out when the curve is surfaced out-of-face or when more than 540 ties per mile are installed.
 - (ii) This report shall be required in addition to the Report of Track Disturbance of CWR Track (Form "TD").
 - (iii) The curve shall be stationed at key geometric locations. Reference stakes shall be added to the field side of the high side of the curve so that curve movement during and/or after maintenance work is performed can be obtained.
 - (iv) This report shall be completed by the Contractor or Operating Railroad Company on whose territory the work is being performed. The "Report of Track Movement" Form with instructions is found in Attachment E.

- (v) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Operating Railroad Company.
- (c) **Report of Joint Elimination by Field Welding (Form “JE”) (Attachment E)**
 - (1) Any time a field weld is made to eliminate a joint, either by the thermite or flash butt method, Form “JE” must be completed by the Contractor/Operating Railroad Company in charge of the work.
 - (i) The “Report of Joint Elimination by Field Welding” is found in Attachment E.
 - (ii) This report shall be required in addition to the Report of Track Disturbance of CWR Track (Form “TD”).
 - (iii) This report shall be completed by the Contractor/Operating Railroad Company on whose territory the work is being performed.
 - (iv) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Mass DOT Rail and Transit Division.
- (d) **Report of Rail Clipping/Anchoring (Form “RC”) (Attachment E)**
 - (1) Any time CWR is adjusted according to the requirements of Section 3.0 of this document the Form, “Record of Rail Clipping/Anchoring,” Form “RC,” must be completed by the Contractor/Operating Railroad Company in charge of the work.
 - (i) The “Record of Rail Clipping/Anchoring”, Form “RC” with instructions, is found in Attachment E.
 - (ii) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Operating Railroad Company.
- (e) **Report of Semi-Annual (Spring/Fall) Inspection of CWR Track (Form “CWR”) (Attachment E)**
 - (1) Any time CWR is inspected annually either in the Spring and/or the Fall according to the requirements of Section 7.0 of this document the Form, “Report of Semi-Annual (Spring/Fall) Inspection of CWR Track,” Form “CWR” must be completed by the Contractor/Operating Railroad Company in charge of the work.
 - (i) The “Report of Semi-Annual (Spring/Fall) Inspection of CWR Track,” Form “CWR”, is found in Attachment E.
 - (ii) When this report is completed, a copy shall be retained on file for the duration of the Operating Contract for review by the Operating Railroad Company.
- (f) **Special Inspections – Earthquakes**
 - (1) When an earthquake occurs, each quake’s magnitude – or inherent strength is measured and reported by the National Earthquake Information Service operated by the U.S. Geological Survey in Golden, Colorado.
 - (2) The Richter scale gages the energy released by an earthquake, as measured by the ground motion recorded on a seismograph. The magnitude of an earthquake is the same no matter where one is located. Its intensity – or the degree to which it is felt in a specific location – varies depending on one’s distance from the earthquake’s epicenter, or center of energy.
 - (3) When an earthquake is reported, the Operating Railroad notifies Maintenance-of-Way to begin a Special Track Inspection.
 - (4) Use the criteria in the Table below to determine whether a special inspection is warranted.

Magnitude (Richter Scale)	Initiate Special Track Inspection	Criteria/Action
Unknown	Yes	Reports of ground shaking in a geographic area. Trains stop within 50-mile radius of reported shaking until inspection is complete.
0.1 to 4.9	No	No action required.
5.0 to 5.4	Yes	When track is within a 30-mile radius of the epicenter, trains in affected areas slow to restricted speed until inspection is complete.
5.5 to 5.9	Yes	When track is within a 50-mile radius of the epicenter, trains stop in the affected area until inspection is complete.
6.0 to 6.9	Yes	When track is within a 100-mile radius of the epicenter, trains stop in the affected area until inspection is complete.
7.0 and above	Yes	When track is within a 150-mile radius of the epicenter, trains stop in the affected area until inspection is complete.

- (5) Special inspections shall identify hazards and identify necessary remedial action(s) to protect the safety of trains operating in the affected areas.
- (6) When conducting a special inspection, check the following:
 - Materials fouling the track, such as trees, pole lines, wires, etc.
 - Alignment, cross level, and profile of the track.
 - Bridge piers, abutments, and bulkheads for signs of structural damage.
 - Substructure and superstructure for damage from large objects falling into structures.
 - Piers, bents, and bridge members for missing components.
 - Signal outages and malfunctions.
 - Landslides in cuts and slope failures in fills.

- (7) Fill out “Special Track Inspection Report” and retain for duration of Operating Contract.

11.0 RECORD KEEPING

(a) Report of CWR Installations

- (1) Rail temperature, neutral temperature, location, and date of CWR installations must be recorded in system logs or data management system and must be kept by the Operating Railroad for the duration of the Contract with the MassDOT Rail and Transit Division.

(b) Report of Maintenance Work in CWR

- (1) Because track maintenance can substantially impact CWR stability and safety, the following records of work done must be recorded on Form “TD” and must be kept by the Operating Railroad for the duration of the Contract with the MassDOT Rail and Transit Division.
 - (i) Rail that is added for any reason.
 - (ii) Repair of broken or defective rails, pull-aparts and welding of rail joints, and changing glued plug insulated joints.
 - (iii) A record of pre-break/cut RNT when rail has pulled apart, broken, or been cut for defect removal (see Attachment C).
 - (iv) A record of the readjusted RNT after a rail has pulled apart, broken, or been cut for defect removal (see Attachment C).
 - (v) Where a curve has been staked and the curve has chorded as a result of surfacing and lining track (Form “TM”, Attachment E).
 - (vi) CWR installation or maintenance work that does not conform to Appendix “A” procedures.
- (2) Any time work is performed in CWR territory by a Contractor and/or the Operating Railroad, an Operating Railroad qualified person under FRA §213.7(c) shall make out a Track Disturbance Form (Form “TD”, Attachment E).
- (3) The Contractor and/or the Operating Railroad shall review the Form “TD” to ensure necessary corrections and adjustments and permanent repairs are made so as to maintain the overall stability of CWR track.

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ATTACHMENT A

DETERMINATION OF ESTIMATE OF PRE-BREAK / PRE-CUT NEUTRAL TEMPERATURE FOR A SERVICE FAILURE IN CWR

(a) General

- (1) In line with Section 5.0's requirements, the RNT will be estimated and recorded on Form "TD" where a weld has broken or a rail has pulled apart, broken or been cut for defect removal (service failure).
- (2) This attachment addresses how to calculate the rail's neutral temperature before the break or before the cut for defect removal.
- (3) Attachment A provides an estimate of neutral temperature based on the measured field gap size, rail size and fastener type.
- (4) The rail size is given in terms of a 6" base rail (i.e., for rail sizes above 115# rails) and for 5-1/2" rail (i.e., for 115# and below).
- (5) The fastener types are given as EOTA (every other tie anchored) and ETA (every tie anchored).
- (6) Concrete tie elastic fasteners, CTEF, and elastic fasteners on wood ties (such as Pandrol type) fall into the ETA category.
- (7) The pre-break/pre-cut estimated RNT must be recorded on Form "TD" when making field repairs and kept in a data base by the Operating Railroad for managing subsequent readjustments.

(b) Use of the following tables: **NOTE**

- (1) For wood tie tracks 200' from a fixed point (switches, turnouts, crossings, bridges, tunnels, etc.) they **DO NOT apply**. For such the data entry on the Form "TD" should be: ***NA**.
- (2) For wood tie tracks between 200' - 400' of a fixed point apply EOTA tables, but data entry Form "TD" should be: ***AP** (for approximate)
- (3) Tables for concrete ties and for wood ties with elastic fasteners, apply 200' beyond a fixed point, but **DO NOT apply within 200'**. For the latter, data entry on Form "TD" should be: ***NA**.
- (4) For wood or concrete tie tracks where breaks/cuts on the same rail are clustered in close proximity (i.e., within 800' of each other). The data entry on Form "TD" should be: ***NA**.
- (5) For iced rail/frozen ballast, tables **DO NOT apply**. For such, data entry on Form "TD" should indicate: ***FB**.

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**Table 1a. 6" Base Rail
Wood Tie Track / Every Other Tie Anchored (EOTA)**

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
60	84	94	102	109	114	119	124	129	133	137	140	144	147	151	154			
55	79	89	97	104	109	114	119	124	128	132	135	139	142	146	149	152		
50	74	84	92	99	104	109	114	119	123	127	130	134	137	141	144	147	150	153
45	69	79	87	94	99	104	109	114	118	122	125	129	132	136	139	142	145	148
40	64	74	82	89	94	99	104	109	113	117	120	124	127	131	134	137	140	143
35	59	69	77	84	89	94	99	104	108	112	115	119	122	126	129	132	135	138
30	54	64	72	79	84	89	94	99	103	107	110	114	117	121	124	127	130	133
25	49	59	67	74	79	84	89	94	98	102	105	109	112	116	119	122	125	128
20	44	54	62	69	74	79	84	89	93	97	100	104	107	111	114	117	120	123
15	39	49	57	6	69	74	79	84	88	92	95	99	102	106	109	112	115	118
10	34	44	52	59	64	69	74	79	83	87	90	94	97	101	104	107	110	113
5	29	39	47	54	59	64	69	74	78	82	85	89	92	96	99	102	105	108
0	24	34	42	49	54	59	64	69	73	77	80	84	87	91	94	97	100	103
-5	19	29	37	44	49	54	59	64	68	72	75	79	82	86	89	92	95	98
-10	14	24	32	39	44	49	54	59	63	67	70	74	77	81	84	87	90	93
-15	9	19	27	34	39	44	49	54	58	62	65	69	72	76	79	82	85	88
-20	4	14	22	29	34	39	44	49	53	57	60	64	67	71	74	77	80	83
-25	-1	9	17	24	29	34	39	44	48	52	55	59	62	66	69	72	75	78
-30	-6	4	12	19	24	29	34	39	43	47	50	54	57	61	64	67	70	73
-35	-11	-1	7	14	19	24	29	34	38	42	45	49	52	56	59	62	65	68
-40	-15	-6	2	9	14	19	24	29	33	37	40	44	47	51	54	57	60	63
-45	-21	-11	-3	4	9	14	19	24	28	32	35	39	42	46	49	52	55	58
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

**Table 1b. 5-1/2" Base Rail
Wood Tie Track / Every Other Tie Anchored (EOTA)**

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
60	86	97	106	113	119	125	130	135	139	144	148	152	155					
55	81	92	101	108	114	120	125	130	134	139	143	147	150	154				
50	76	87	96	103	109	115	120	125	129	134	138	142	145	149	153			
45	71	82	91	98	104	110	115	120	124	129	133	137	140	144	148	151		
40	66	77	86	93	99	105	110	115	119	124	128	132	135	139	143	146	149	152
35	61	72	81	88	94	100	105	110	114	119	123	127	130	134	138	141	144	147
30	56	67	76	83	89	95	100	105	109	114	118	122	125	129	133	136	139	142
25	51	62	71	78	84	90	95	100	104	109	113	117	120	124	128	131	134	137
20	46	57	66	73	79	85	90	95	99	104	108	112	115	119	123	126	129	132
15	41	52	61	68	74	80	85	90	94	99	103	107	110	114	118	121	124	127
10	36	47	56	63	69	75	80	85	89	94	98	102	105	109	113	116	119	122
5	31	42	51	58	64	70	75	80	84	89	93	97	100	104	108	111	114	117
0	26	37	46	53	59	65	70	75	79	84	88	92	95	99	103	106	109	112
-5	21	32	41	48	54	60	65	70	74	79	83	87	90	94	98	101	104	107
-10	16	27	36	43	49	55	60	65	69	74	78	82	85	89	93	96	99	102
-15	11	22	31	38	44	50	55	60	64	69	73	77	80	84	88	91	94	97
-20	6	17	26	33	39	45	50	55	59	64	68	72	75	79	83	86	89	92
-25	1	12	21	28	34	40	45	50	54	59	63	67	70	74	78	81	84	87
-30	-4	7	16	23	29	35	40	45	49	54	58	62	65	69	73	76	79	82
-35	-9	2	11	18	24	30	35	40	44	49	53	57	60	64	68	71	74	77
-40	-14	-3	6	13	19	25	30	35	39	44	48	52	55	59	63	66	69	72
-45	-19	-8	1	8	14	20	25	30	34	39	43	47	50	54	58	61	64	67
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

**Table 2a. 6" Base Rail
Wood or Concrete Tie Track / Every Tie Anchored (ETA)**

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
60	90	102	111	119	126	133	139	144	149	154	159							
55	85	97	106	114	121	128	134	139	144	149	154	158						
50	80	92	101	109	116	123	129	134	139	144	149	153	157					
45	75	87	96	104	111	118	124	129	134	139	144	148	152	156				
40	70	82	91	99	106	113	119	124	129	134	139	143	147	151	155			
35	65	77	86	94	101	108	114	119	124	129	134	138	142	146	150	154		
30	60	72	81	89	96	103	109	114	119	124	129	133	137	141	145	149	153	
25	55	67	76	84	91	98	104	109	114	119	124	128	132	136	140	144	148	151
20	50	62	71	79	86	93	99	104	109	114	119	123	127	131	135	139	143	146
15	45	57	66	74	81	88	94	99	104	109	114	118	122	126	130	134	138	141
10	40	52	61	69	76	83	89	94	99	104	109	113	117	121	125	129	133	136
5	35	47	56	64	71	78	84	89	94	99	104	108	112	116	120	124	128	131
0	30	42	51	59	66	73	79	84	89	94	99	103	107	111	115	119	123	126
-5	25	37	46	54	61	68	74	79	84	89	94	98	102	106	110	114	118	121
-10	20	32	41	49	56	63	69	74	79	84	89	93	97	101	105	109	113	116
-15	15	27	36	44	51	58	64	69	74	79	84	88	92	96	100	104	108	111
-20	10	22	31	39	46	53	59	64	69	74	79	83	87	91	95	99	103	106
-25	5	17	26	34	41	48	54	59	64	69	74	78	82	86	90	94	98	101
-30	0	12	21	29	36	43	49	54	59	64	69	73	77	81	85	89	93	96
-35	-5	7	16	24	31	38	44	49	54	59	64	68	72	76	80	84	88	91
-40	-10	2	11	19	26	33	39	44	49	54	59	63	67	71	75	79	83	86
-45	-15	-3	6	14	21	28	34	39	44	49	54	58	62	66	70	74	78	81
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

**Table 2b. 5-1/2" Base Rail
Wood or Concrete Tie Track / Every Tie Anchored (ETA)**

Field Measured Rail Break/Rail Cut Temp (°F)	Measured Rail Gap (in)																	
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
60	92	106	116	125	133	139	146	152										
55	87	101	111	120	128	134	141	147	152									
50	82	96	106	115	123	129	136	142	147	153								
45	77	91	101	110	118	124	131	137	142	148	153							
40	72	86	96	105	113	119	126	132	137	143	148	152						
35	67	81	91	100	108	114	121	127	132	138	143	147	152					
30	62	76	86	95	103	109	116	122	127	133	138	142	147	151				
25	57	71	81	90	98	104	111	117	122	128	133	137	142	146	151			
20	52	66	76	85	93	99	106	112	117	123	128	132	137	141	146	150		
15	47	61	71	80	88	94	101	107	112	118	123	127	132	136	141	145	149	153
10	42	56	66	75	83	89	96	102	107	113	118	122	127	131	136	140	144	148
5	37	51	61	70	78	84	91	97	102	108	113	117	122	126	131	135	139	143
0	32	46	56	65	73	79	86	92	97	103	108	112	117	121	126	130	134	138
-5	27	41	51	60	68	74	81	87	92	98	103	107	112	116	121	125	129	133
-10	22	36	46	55	63	69	76	82	87	93	98	102	107	111	116	120	124	128
-15	17	31	41	50	58	64	71	77	82	88	93	97	102	106	111	115	119	123
-20	12	26	36	45	53	59	66	72	77	83	88	92	97	101	106	110	114	118
-25	7	21	31	40	48	54	61	67	72	78	83	87	92	96	101	105	109	113
-30	2	16	26	35	43	49	56	62	67	73	78	82	87	91	96	100	104	108
-35	-3	11	21	30	38	44	51	57	62	68	73	77	82	86	91	95	99	103
-40	-8	6	16	25	33	39	46	52	57	63	68	72	77	81	86	90	94	98
-45	-13	1	11	20	28	34	41	47	52	58	63	67	72	76	81	85	89	93
Estimated RNT in °F																		

Note: For rail temperatures above 60°F, the estimated RNTs must be developed by interpolating the existing table.

ATTACHMENT B

RECOMMENDED PROCEDURES FOR DISTRESSING CONTINUOUS WELDED RAIL (CWR) PREVIOUSLY LAID IN TRACK (IN CONFORMANCE WITH SECTION 5.0 REQUIREMENTS)

- (a) MassDOT's CWR Policy prescribes distressing requirements for newly installed CWR as per Section 3.0, including a general procedure for distressing rail.
 - (1) **Attachment B provides more detailed Recommended Procedures for distressing CWR previously laid in track based on current industry best practice guidelines.**
- (b) **Definition:** Distressing is the operation of removing (or sometimes adding) rail in CWR to make the longitudinal thermal stress (force) to be zero at a prescribed temperature.
 - (1) MassDOT's preferred Rail Laying Temperature (RLT) is 105°F.
- (c) **Common Distressing Types for Existing CWR in Track:**
 - (1) There are typically three types, or categories, of distressing which are driven by specific maintenance needs:
 - (i) **programmed distressing,**
 - (ii) **reactive or emergency distressing,** and
 - (iii) **curve distressing.** (Note: although curve distressing can be both programmed and reactive, a separate category is given here due to its general complexity).
 - (2) **Programmed distressing** is when one or more strings of rail are deemed to be sufficiently below (or above) RLT to warrant rail neutral temperature (RNT) adjustment. When several strings require distressing on MassDOT-owned rail lines, often the out-of-face distressing shall be accomplished by a Contractor working directly for MassDOT Rail and Transit.
 - (3) **Reactive or emergency distressing** is an imminent action that addresses tight, wavy, kinky rail, and other buckling prone conditions. This type of work on MassDOT-owned rail lines is usually accomplished by the Operating Railroad Personnel.
 - (4) **Curve distressing** applies to stress adjustments of curves due to cold temperature chording-in or to excessive curve movements resulting from maintenance actions performed when rail is in tension. This type of work on MassDOT-owned rail lines is usually accomplished by Operating Railroad Personnel or by a Contractor working directly for MassDOT Rail and Transit.
- (d) **General Guidelines for Programmed Distressing of CWR Strings In Track Up to 1600' In Length.**
 - (1) **Programmed Distressing may be used for:**
 - (i) Rail that was laid at colder temperatures sufficiently below a target RNT of 105°F; or
 - (ii) Rail laid at "hot" temperatures, which exhibits excessive rail movement (running rail); or
 - (iii) Locations where recent track maintenance (lining, surfacing, lifting, etc.) has lowered RNT below RLT -10°F or 95°F; or

- (iv) Locations where the Operating Railroad and/or MassDOT Rail and Transit Division deems it necessary.
- (2) The following applies when distressing:
 - (i) The means, methods, and equipment used when distressing rail shall be approved by MassDOT Rail and Transit or its representative.
 - (ii) The range of rail temperature at which rail is distressed shall be approved by MassDOT Rail and Transit or its representative.
 - (iii) Distressing should be scheduled and completed when the ambient temperature provides sufficient heat so that the rail temperature is as near as possible to the target RLT of 105°F; unless approved by MassDOT Rail and Transit.
 - (iv) **No more than 1,600' of rail may be distressed at any given time (1,600' strings).** This is a continuous 1600' string and/or a 1600' string with a cut or joint in the middle (800'+/- each side of cut and/or joint).
- (3) The following preparatory work shall be performed:
 - (i) Make reference match marks around the existing joint or rail cut location:
 - On the base of rail and tie plates on unanchored ties within 10'+/- of the joint and/or cut in the rail; or
 - On the left side of the elastic fastener tie plate or the side opposite the drive on elastic fastener or clip within 10'+/- of the joint and/or cut in the rail; and
 - (ii) When distressing one or more strings, mark the quarter points of the string to be distressed.
 - (iii) When out-of-face distressing, set offset stakes at the far end of the rail to be distressed to measure any rail panel "pull" back at the end of the CWR string where the rail is cut and/or a joint is located.
 - (iv) Rail panel "pull back" is often associated with wood tie track anchored on every tie with elastic fasteners or in areas with weak crib ballast.
 - (v) Rail panel "pull back" movements (inches) shall be measured after:
 - The rail has been correctly expanded at the quarter points and at the end by using the ambient temperature, a rail heater and/or a hydraulic rail puller, and;
 - The CWR string has been anchored and/or clipped.
 - (vi) Rail panel "pull back" measured is the same as ADDING RAIL and the CWR shall have to be unclipped and expanded again to eliminate any pull back when it is finally anchored and clipped before it is finally jointed and/or welded.
 - (vii) Measured rail end movements away from the joint or cut at the end of the CWR string at the match marks is the same as ADDING RAIL. The CWR shall have to be unclipped and expanded again to eliminate any rail end movement away from the joint and/or cut before the CWR is finally jointed and/or welded.
 - (viii) The total expansion length required, using the temperature differential, shall be calculated so as to achieve a target RLT of at least 105°F.
 - (ix) The amount of rail to be expanded when using the temperature differential moved can be determined by using the Report of Rail Clipping/Anchoring, Form "RC" found in Attachment E.

- (x) To improve RNT, the total required expansion for any string, shall consist of the following:
 - The calculated expansion required from the temperature “differential”, and;
 - Any measured “rail panel pull back”, and;
 - Any measured rail end movements away from the joint and/or cut.
 - (xi) If in compression, the rail shall be cut with a torch (see Paragraph (g) below) and placed in a position that will permit the rail ends to bypass each other, so as to permit the rail to expand freely.
 - (xii) If in compression, the rail shall be unanchored or unclipped from the cut or joint at the end of the string to be expanded back to the beginning of the string.
 - (xiii) If the base of rail is caught in the elastic rail fastener plates, the rail shall be raised from the tie plates or tie pads. Place base of rail on risers (spikes and/or rollers) to allow the rail to expand freely; risers shall be placed every 12th to 15th tie (especially in areas of elastic fastener plates). There may be a need to add additional risers at closer intervals on curves.
 - (xiv) If risers are required, all rail anchors, clips and insulators must be removed and risers placed to ensure the base of the rail is free to move relative to the tie plate and/or tie seat (i.e., stress free).
 - (xv) If power vibrators are used, it may not be necessary to place the rail on risers in areas of cut spikes and conventional tie plates.
 - (xvi) Ensure that vibrated rail is totally free to expand/contract longitudinally (i.e., stress free).
- (e) **Programmed Distressing: Adjusting Short CWR Lengths (Spot Distressing) Already in Track in Wood and Concrete Tie Territory)**
- (1) This method is generally used by the Operating Railroad MW forces to repair a service failure such as a pull-apart, broken rail, or broken weld and to remove a defective rail and/or add a plug rail or by making a cut in CWR.
 - (2) When distressing short lengths Operating Railroad MW forces generally use the ambient temperature and/or a rail puller to obtain the expansion required.
 - (3) In this case, the rail to be distressed should be centered, if possible, on an existing joint that can be removed and/or a cut made in the CWR string. Approximately 50% of the area to be distressed should be on either side of the joint and/or cut.
 - (4) In this case, the rail on either side of the joint and/or cut is expanded towards the rail cut and/or joint location.
 - (5) The base of the rail and plate should be marked at or within 10' of either side of the joint or cut and then at 50' stations or the quarter points for the full length of the rail to be expanded.
 - (6) Generally the amount of rail to be expanded on either side of the joint and/or cut is from 195' (380' total) to 390' (780' total). However, longer lengths of CWR, up to 800' (1600' total) may be distressed by this method.
 - (7) The movement at these stations should be recorded when the joint is removed and/or the rail is cut and recorded on Form “TD.”
 - (8) A rail puller can be used, along with the ambient temperature and/or a heater, to increase the RNT, to at least **RLT -10°F**, when making repairs.

- (9) Because of the need to expand rail in two directions, it may be somewhat easier to achieve the required expansion by using the ambient temperature in warmer periods of the year and/or by using a rail puller. A rail heater is more problematic because of the need to have the heater working on both sides of the joint and/or cut and having to move the heater over the joint or cut to expand rail in two directions.
- (10) See Attachment C "Recommended Procedures for Adjusting CWR After a Break (Service Failure) or Cut Below the Target RLT (105°F)."
- (f) **Programmed Distressing: Adjusting Numerous CWR Strings Out-of-Face Already in Track in Wood and Concrete Tie Territory (Preferred Method)**
 - (1) This procedure applies to distressing CWR in track as part of programmed maintenance when a length of rail(s) is deemed to be sufficiently below (or above) the target RLT of 105°F to warrant RNT readjustment.
 - (2) The preferred way to expand rail is to heat the rail naturally or with a rail heater. A rail puller may be used when expanding rail to help achieve the required expansion and/or hold the expanded rail in place while installing anchors and/or clips.
 - (3) The rail to be distressed is usually expanded from the starting point to the end of the string being distressed in one continuous direction.
 - (4) The maximum length of rail to be distressed at any time is 1600'.
 - (i) Once a string to be distressed is identified, the end of the string at an existing joint, or a location where the rail is cut, shall have the rail ends mismatched to allow unobstructed movement of the rail string. Then, as the rail is heated naturally by sunlight and/or with a rail heater, the rail is expanded in the direction towards the joint and/or cut.
 - (ii) Before expanding the rail string, anchors, and/or clips shall be removed starting at the far end of the string at the joint and/or rail cut back to the beginning of the rail string.
 - (iii) Measure the existing rail temperature and subtract from the target RLT of at least 105°F to determine the temperature differential to be used. See the Report of Rail Clipping/Anchoring (Form "RC") in Attachment E to calculate the total expansion required. The expansion required depends upon the rail temperature differential and total length of the CWR string. The required amount of expansion shall be marked at the one-quarter points on the base of the rail and plates.
 - (iv) Mark the quarter points on the base of the rail and tie plates of rail strings to be expanded.
 - (v) Expanding rail continuously in one direction allows MW crews to mark and expand rail at the quarter points and then re-clip rail in a continuous motion from the point of beginning to the end of the string at the joint and/or cut in the CWR.
 - (vi) Heat (natural or with a rail heater) should be uniformly applied along the string to be distressed until the required expansion has been obtained at the quarter points to include the end of the string at the joint and/or cut rail.
 - (vii) When using a rail heater, if any quarter point does not have the required expansion, either before or after anchoring/clipping, the string shall have to be reheated. The rail heater will back over the portion that needs to be reheated without applying heat.
 - (viii) Then the heater shall work towards the end of the string at the joint or rail cut applying heat until the required expansion is obtained.

- (ix) Re-clip and/or re-anchor the rail as soon as expansion at the quarter points has been achieved. Clip and/or anchor using the standard anchor patterns given in Section 4.0 "Anchoring of Rail."
 - (x) The CWR shall not be considered to be distressed until the required expansion at all the quarter points have been realized. When distressing strings of CWR, rail expansion, and not rail temperature, determines if a string of CWR has been distressed.
 - (xi) A rail puller can be used to hold the required expansion and/or to help get the required expansion. At least 20 ties on the next string to be distressed should be solid box anchored and/or clipped to provide sufficient holing power for the rail puller to hold or pull the string being expanded.
- (g) **Torch Cutting CWR in Track**
- (1) The preferred method of cutting CWR in compression is with a torch.
 - (2) Rail shall only be torch cut in an emergency to relieve thermal stress in the rail prior to expanding and then cutting with a rail saw.
 - (3) Operating Railroad personnel and/or Contractors shall be trained to cut rail with a torch in accordance with their in-house Safety Procedures.
 - (4) Operating Railroad personnel and/or Contractors shall not cut rail with a torch on MassDOT property unless trained to do so by their respective companies.
 - (5) A recommended procedure for torch cutting rail in compression is illustrated in Attachment F "Torch Cutting Rail."
 - (6) Person making torch cut:
 - (i) Shall stand on opposite side of rail from which it is expected to move when making torch cut.
 - (ii) In curve if buckle/alignment is on high side of curve; stand on low side of curve.
 - (iii) In tangent track, stand on side opposite from misalignment or buckle.
 - (7) Initially, remove anchors only in an area large enough to facilitate the torch cut. Do not remove any additional anchors until the torch cut is made.
 - (8) Clear personnel from misalignment area when rail is cut as rail/track may move suddenly when compressive stress is relieved by torch cutting.
 - (9) Additional anchors shall be removed after the rail is torch cut to facilitate the necessary rail expansion movement, the misalignment of rail ends and repair.
 - (10) If a torch cut rail is to be welded within 15 minutes of cutting, it shall be trimmed back at least 3/8" on each rail end with a saw before welding. **This practice requires the approval of the local MassDOT Rail and Transit Field Representative.**
 - (11) All torch cut rail ends shall be trimmed back:
 - (i) At least 2" (AREMA Chapter 4.7.3) and/or;
 - (ii) Beyond the heat affected zone on either side of the torch cut which will appear as a different color on the web of the rail; or whichever is greater;
 - (iii) With a rail saw before a field weld is made and/or a joint is applied.
 - (12) If necessary, in an emergency, to pass a train over a torch cut rail end, before the torch cut ends are trimmed back:
 - (i) Joint bars may be installed with at least two bolts in each rail end, if possible.

- (ii) Each train may be passed over the joint at a maximum of 10F/15P provided the move is under the supervision of a qualified person under FRA §213.217(a)(b)(c)(d).
- (h) **Reactive or Emergency Distressing: Cutting Tight Track/CWR in Compression**
 - (1) If a misalignment (wavy, kinky or nervous rail) is found in track that exceeds values for any class of track found in FRA §213.55, Alinement, take appropriate remedial action per FRA §213.9.
 - (2) Locate point of maximum misalignment.
 - (3) Fill out Form “TD” and include rail temperature and alinement deviation/defect as per FRA §213.55.
 - (4) Select a point to make a torch cut. It may be advisable to cut at a point near, but not exactly at the center of the misalignment where compressive stresses may be the highest.
 - (5) A recommended procedure for torch cutting rail in compression is illustrated in Attachment F “Torch Cutting Rail.” See additional torch cutting information found in (g).
 - (6) Make repairs in accordance with, “Reactive or Emergency Distressing” (see Example 3).
- (i) **Reactive Distressing: Adjusting Tight, Wavy Nervous Rail: Procedures**
 - (1) Reactive distressing consists of actions taken to address tight, wavy, kinky rail conditions seen in CWR track. Usually tight, wavy, or nervous rail is discovered when the rail temperatures are warm.
 - (2) Such conditions typically are associated with large reductions in rail temperatures and indicate a possible imminent track buckle.
 - (3) First establish the length of rail exhibiting the tight, wavy condition (i.e., the length of rail requiring neutral temperature adjustment through distressing).
 - (4) **The total length for distressing is a recommended minimum of 1.5 times the estimated tight, wavy length (although 2 times is the MassDOT preferred).**
 - (5) **Note: 400' of unfastening (200' either side of torch cut) is a *minimum* distance.** More length is required if the estimated L_{distress} is longer than 260', in which case the unfastening length rule of thumb is:

$\text{Unfastening Length} = 1.5 \times L_{\text{distress}}$
 - (6) Generally *both* rails should be distressed unless otherwise dictated.
 - (7) The procedure to follow is as described below.
 - (i) Estimate the length of the tight, kink, wavy rail segment; locate the midpoint where rail is to be cut.
 - (ii) Record the length of rail to be distressed (i.e., $L_{\text{distress}} = \text{_____ ft.}$).
 - (iii) Cut rail. (**Note: typically torch cutting is required**) and misalign rail ends.
 - (iv) Keep cutting rail with rail saw until it stops moving; this may require several cuts.
 - (v) **After rail stops moving, unfasten rail for minimum required distance on both sides of the cut starting at the cut and working away from the cut.**
 - (vi) After unfastening CWR, continue cutting rail out until there is no more movement; at this point the rail ends should just be touching.
 - (vii) Measure and record the rail temperature.

- (viii) Refer to MassDOT's preferred RLT (105°F) and compare it with the measured rail temperature to determine the distress *temperature differential*. If the measured rail temperature is *lower* than the RLT, proceed to Form "RC," "Report of Rail Clipping/Anchoring" in Attachment E to determine the additional rail to be removed.
 - (ix) If the measured rail temperature is *above* RLT, no additional rail needs to be removed, and proceed to next step.
 - (8) Rail shall be expanded by ambient temperature and/or pulled with a rail puller.
 - (9) f CWR is cut with a torch, both rails on either side of the torch cut shall have to be cut back at least 2" with a rail saw (see Paragraph (g) above).
 - (10) A plug rail **shall** have to be added. A minimum 18' plug in tangent track shall be installed.
 - (11) Rail to be cut out when an 18' plug rail is installed includes:
 - (i) The length of the plug rail.
 - (ii) The amount that the rails on either side of the torch cut are to be expanded from Form "RC," "Report of Rail Clipping/Anchoring." See Attachment E.
 - (iii) An additional 1" allowance for each end of the plug if it is to be field welded (2x1" = 2").
 - (iv) If installed plug rail is to be jointed and not welded, no additional rail for welding needs to be removed. Comply with FRA §213.119(c).
 - (v) DO NOT ADD RAIL.**
 - (12) If field welding, add the weld allowance (usually 1") to the CWR rail expansion value and cut out the indicated amount of rail.
 - (13) Make the weld or install joint bars and reapply rail fasteners or anchors. (Note: some pulling of the rail may be required to close rail to welding gap.)
 - (14) Record distress temperature differential, distress length, unfastening length, the readjusted RNT, and the amount of rail removed on Form "TD."
 - (15) Proceed to distress the other rail.
- (j) Distressing Curves Procedures:**
- (1) Curve distressing may be required in curves when curves have chorded in or moved in during cold temperatures or due to heavy maintenance activities in curves such as:
 - (i) Out-of-face surfacing and aligning of track
 - (ii) Out-of-face tie installation
 - (iii) Undercutting of track
 - (iv) Shoulder ballast cleaning
 - (2) Heavy maintenance activities performed when CWR is in tension generally makes curve move in and/or chord in.
 - (3) More specifically, when curves undergo lateral movements due to temperature changes, either naturally or due to maintenance, the result can be substantial changes in neutral temperature which requires readjustment by distressing.
 - (4) There are two methods of distressing curves: (1) cutting rail out (preferred), and (2) curve realignment out.
 - (5) Distressing via curve realignment is the easier of the two methods, but requires knowledge of the curve position (i.e., the amount of movement), hence, requires curve staking, monitoring, record keeping, and correct tamper lining management.

- (6) Appendix “A” addresses the need to stake curves $\geq 3^\circ$. **At a minimum, curves $\geq 3^\circ$ shall be staked when surfacing and aligning when the rail temperature is below 55°F or 50°F below the preferred RLT of 105°F.** See Form “TM,” “Report of Track Movement” in Attachment E.
- (7) Staking of curves: At a minimum, stake curves $\geq 3^\circ$ prior to out-of-face surfacing and lining.
- (8) MassDOT Rail and Transit Division may require the staking of curves for other types of work as given in (j) (1).
- (9) Place a minimum of three reference stakes uniformly spaced around the curve. Additional stakes may be required due to the overall length of the curve (see Form “TM,” Attachment E).
- (10) Inspecting for curve movement: Inspect for curve movement periodically after the work, especially during periods of large temperature changes. **Where a curve has been staked and curve has chorded 3" or more ($\geq 3"$) to the inside, the curve shall be lined out and/or distressed.**
- (11) **A temporary speed restriction (TSR) of 40F/40P MPH or less shall be applied if the curve is not lined out or the rail is not distressed when the rail temperature reaches the target RLT of 105°F.** Take additional remedial action as required.

Example 1: Programmed Distressing (spot distressing): It is suspected that a 1,000' section of rail on wood ties with cut spikes and DSC plates and anchors was laid “cold” (well below the territory’s RLT), and it needs to be distressed to readjust to RLT = 105°F. The rail is being cut for distressing at a rail temperature of 70°F. How to proceed?

Step 1: Add match marks on both sides and within 10' of the rail to be cut. From these match marks determine the amount of rail moving together when the rail is cut. Place marks at 50' stations for up to 200' on either side of the proposed rail cut to monitor and record rail movement when rail is cut and then when rail is expanded to a RNT of 105°F.

Step 2: Add “witness stakes” in area where rail is to be cut. Measure any panel “pull back” on both sides of rail cut. Panel “pull back,” if any in inches, must be added to required rail expansion discussed below. **DO NOT ADD RAIL**

Step 3: For this example assume that the rail is in compression. Cut rail at midpoint with a rail saw if possible and bypass rail ends. If the rail is in compression, torch cutting may be required. If torch cutting is required an 18' plow or larger shall have to be cut in because the minimum cut back with a rail saw on either side of a torch cut is 2" or a minimum of 4" of rail plus the width of the torch cut is removed.

Step 4: For this example assume the rail was able to be cut with a saw. This means that the rail had a neutral temperature just below 70°F.

Step 5: From match marks determine amount of rail moving together.

Step 6: Unfasten 500' in both directions starting from the rail cut and working away from the rail cut. After anchors are removed, tap or vibrate rail and let rail continue to run. Place base of rail on spikes and/or rollers to get rail out of plates if that helps to expand rail. Add spikes and/or rollers starting at joint or cut and working backwards to beginning of string to be expanded.

Step 7: Record total rail movement on Form “TD” at a rail temperature of 70°F.

Step 8: Cut out the excess rail moved together, leaving the rail ends just touching. At this point this unfastened rail has a neutral temperature of 70°F which needs to be raised to RLT=105°F.

Step 9: Check rail temperature and refer to “Report of Rail Clipping/Anchoring,” Form “RC” in Attachment E to compute required expansion in inches for a temperature differential of $105^{\circ}\text{F} - 70^{\circ}\text{F} = 35^{\circ}\text{F}$ and calculate the gap required for two pieces at 500' or; $2 \times 1\text{-}3/8" = 2\text{-}6/8"$ or $2\text{-}3/4"$.

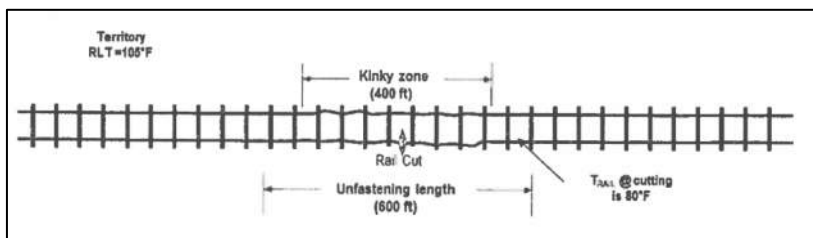
Step 10: Expand rail with ambient temperature and/or rail puller.

Step 11: Cut out the $2\text{-}3/4" + 1"$ for field weld allowance; pull the rail together for the 1" gap, field weld and reapply anchors.

Step 12: Record total amount of rail removed, distressing temperature, temperature differential, and the readjusted neutral temperature on Form “TD.”

Step 13: Proceed to distress the other rail.

Example 2: Reactive Distressing: Adjusting Tight, Wavy, Nervous Rail: There is a 400' rail segment exhibiting a wavy/tight rail condition or rail kink. A kink is a formation or a misalignment greater than 1" on track not related to work done by MW Forces. A kink normally occurs when rail temperatures are thought to be high. The territory's RLT is 105°F , and the distressing is done at a rail temperature of 80°F . How to proceed with the distressing?



Step 1: Distress length is 400'; cut rail out with torch at midpoint until no more rail movement.

Step 2: Remove fasteners for 1.5 x kinky zone or 600' (300' on either side of cut note $600' = 1.5 \times 400'$). Start at the torch cut and remove fasteners moving away from the cut. Keep letting rail run until no more rail movement.

Step 3: Measure rail temperature (here 80°F); and compare with RLT = 105° . The temperature differential is 25°F .

Step 4: Here the rail temperature is **lower** than laying temperature; therefore more rail needs to be removed. So rail needs to be expanded. See Form “RC,” Attachment E.

Step 5: Proceed to Attachment E to determine additional rail to cut out for a 25°F distress temperature differential and the $(2 \times 300')$ 600' length, this is $1\text{-}1/4"$.

Step 6: Cut out the rail expansion required of $1\text{-}1/4"$ plus the 1" weld allowance if rail is to be field welded.

Step 7: If CWR is torch cut, both rails on either side of the torch cut shall have to be cut back at least 2" with a rail saw. Because only $1\text{-}1/4"$ of expansion is required, a plug rail will have to be cut in. A minimum of 18' plug shall be installed in tangent track. Rail to be cut out if an 18' plug rail is installed includes:

- The length of the plug rail.
- The amount that the rails on either side of the torch cut are to be expanded from Form “RC.” In this case $2 \times 5/8" = 1\text{-}1/4"$ total.

- An additional 1" allowance for each end of the plug if it is to be field welded (2X1" = 2").
- If the plug is to be jointed and not welded, no additional rail other than the plug length and the required expansion amount of 1-¼" needs to be removed. Comply with FRA §213.119(c).
- **DO NOT ADD RAIL.**

Step 8: Expand rails (both sides of torch cut) by the ambient temperature and with a rail heater and/or rail puller, cut in plug rail, reapply anchors or fasteners, make field welds and/or drill rail ends and apply 6 hole joint bars.

Step 9: Record rail temperature (80°F); RLT (105°F); distress length (400'); unfastening length (600') and 1-1/4" rail cut out on Form "RC."

Step 10: Proceed to distress other rail.

ATTACHMENT C

RECOMMENDED PROCEDURES (RPS) FOR READJUSTING/DISTRESSING CONTINUOUS WELDED RAIL (CWR) AFTER A BREAK, PULL-APART (SERVICE FAILURE) OR CUT BELOW THE TARGET RAIL LAYING TEMPERATURE (RLT = 105°F)

(a) **Definitions:**

- (1) The “Rail Laying Temperature” (RLT) is the target installation temperature of welded rail for the MassDOT Rail and Transit Division.
- (2) For existing CWR in track, when service failures are repaired and cuts in CWR are made by Railroad Operating Companies, the minimum acceptable RLT to be achieved when making repairs and/or cuts is RLT -10°F or 95°F.
- (3) All readjustments/distressing of CWR on MassDOT Rail and Transit Division shall be made to achieve a target RLT of at least 105°F.
- (4) As per Section 3.0, “Installation and Adjustment of CWR,” MassDOT requires rail to be installed at RLT=105°F with construction tolerance of -10 to +10°F (i.e., 95°F to 115°F).
- (5) The “Rail Neutral Temperature” (RNT) is the rail temperature at which the net longitudinal force in the rail is zero, and is referred to as rail neutral temperature.

(b) **Overview:**

- (1) These procedures address readjusting the RNT under the following conditions:
 - (i) Service Failures:
 - Broken joint bars
 - Broken welds/field or plant
 - Pull-aparts with broken bolts and bent bolts
 - Broken rails
 - Defective glued plug insulated joint rails
 - (ii) Rail defect or rail removals (cutting rail).
 - (iii) Cutting rails and installing plug rails.
- (2) Rail that has pulled apart, broken, or been cut for defect removal must be readjusted to the RLT -10 safe range prior to rail temperatures exceeding those outlined in Table 1 below.

**Table 1. Temperature When CWR (RNT) Must be Adjusted or
Speed Restrictions Applied
For Rail Breaks on One Rail Only**

Rail Temperature (°F) at Which Rail Break or Cut Occurred	Rail Temperature (°F) at Which to Readjust or Apply Temporary Speed Restriction (TSR)
60	110*
50	110*
40	110*
30	110*
20	110*
10	110*
0	105*
-10	100*
-20	95*
-30	90*
*Table based on FRA/RSAC, but modified for MassDOT Rail and Transit Division requirements.	

Note: For the special case where both rails break and/or are cut within 200' of each other and when both rail's readjustment and permanent repairs are deferred to warm temperatures, the following formula shall apply:

$T_{Return} = (T_{RB1} + T_{RB2}) / 2 + 70^{\circ}F$, and T_{Return} shall not exceed 110°F.

(As an example, rail 1 breaks at 10°F, and rail 2 at 30° F, the return temperature is 90°F, and NOT as would be individually designated by Table 1)

- (3) If rail RNT has not been adjusted prior to rail return temperatures exceeding the values in Table 1:
 - (i) **A temporary speed restriction (TSR) of not more than 25F/25P MPH shall be applied, or**
 - (ii) A temporary speed restriction of not more than 40F/40P MPH can be applied when a mandatory daily inspection is conducted during the heat of the day.
 - (iii) **If rail return temperatures do not exceed Table 1 values, the RNT shall be readjusted within 365 days.**
- (4) The following data must be recorded on Form "TD" at the time of the break, pull-apart, and/or cut:
 - (i) Rail temperature at the time of the pull-apart/break/cut,
 - (ii) Gap size (as measured within $\pm 1/32"$),
 - (iii) Rail size,
 - (iv) Tie type (wood or concrete),
 - (v) Anchor/fastener type (anchors or elastic fasteners); and the condition as described by "weak", "average", and "strong" as described below:
 - Weak: missing anchors; the majority are not tight against the ties; evidence of rail slipping or moving longitudinally through anchors/clips;

crib ballast more than 2" below the tops of the ties; poor tie condition; more than half of the tie insulators are cracked, broken or not seated in the shoulder; tie pads are slipping or deteriorated; evidence of rail seat abrasion.

- Average: anchors are in place and tight against the ties; no evidence of rail creep; tie condition is good; full ballast section; most insulators are sound and seated correctly; tie pads are not worn or moving in the rail seat; no evidence of rail seat abrasion.
 - Strong: new construction or relay rail with new anchors or fasteners; full ballast section and well consolidated AND which do not exhibit any of the "weak" or "average" characteristics.
- (vi) The anchor pattern (every tie versus every other tie), and
- (vii) If any "special conditions" apply* (see (5) below).
- (5) Attachment A tables for the determination of pre-break/cut RNTs, do not apply for "special conditions" which are defined as:
- (i) Breaks/cuts clustered in "close" proximity to each other on the same rail (i.e., within 800' of each other);
 - (ii) Breaks/cuts are within 400' of a "fixed" point; or
 - (iii) Breaks/cuts in iced rail/frozen ballast conditions.
- (6) Use the tables in Attachment A to determine the pre-break/cut RNT, but note special conditions and/or exclusions (as above). Table 2 provides a guide as to the information found and where it is located in Attachment A (see below):

Table 2. Attachment A Table Use

Rail Base Size	Rail Weight	Anchorage Type	Attachment A Table to Use
6"	136/132	Every other tie anchored	1A
5-1/2"	115/100	Every other tie anchored	1B
6"	136/132	Every tie anchored*	2A*
5-1/2"	115/100	Every tie anchored*	2B*
* Use for concrete ties, and for wood ties with elastic fasteners.			

- (7) 6" base rail found in Attachment A is currently the standard rail being purchased and installed by the MassDOT Rail and Transit Division.
- (8) 5-½" base rail found in Attachment A was laid on MassDOT Rail and Transit owned rail lines and is still in track.
- (c) **Procedures Used to Readjust Rail When A Service Failure Occurs and/or CWR Is Cut**
- (1) The procedures used to readjust rail after a break or cut vary based upon Table 3's summary below.

Table 3 – RNT Readjustment Procedures Summary

APPLICATION	DESCRIPTION
Attachment A + Tables 1 & 2	Evaluation of pre-break/cut RNTs and return temperatures for adjustment. Results are required inputs Scenarios 1-3.
Scenario 1a	RNT readjustment procedure when repairing broken/defect cut rail when it can be performed at the time of break/cut. Such requires a pre-break/cut RNT in the RLT-10 range thus allowing rails to be pulled together through anchors and fasteners for an RNT restoration to RLT-10
Scenario 1b	Same as 1a, but when additional rail removal is required for readjustment, and when rail is pullable through anchors/fasteners. This Scenario provides additional rail removal required for RNT restoration to RLT-10
Scenario 2	Procedure for readjusting RNT after rail break/defect cut when interim repairs are required (such rail addition via plug) and when RNT readjustment are deferred for a later time as per Table 1 at which time conventional distressing of 780 ft of rail is required to RLT
Scenario 3	Readjustment procedure for special cases when Attachment A is NOT applicable. These include: (a) Multiple breaks on same rail within close proximity (800 ft) of each other (b) Breaks/cuts within 400 ft of fixed points (bridges, tunnels, crossings, switches/turnouts, etc.) (c) Extremely stiff, frozen rail/ballast conditions
Notes: (i) if for any reason in 1a or 1b the rail gap to be closed for adjustment is NOT pullable through anchors/fasteners, revert to Scenario 2, (ii) Scenario 3's (a) and (b) reverts to Scenario 2, and (iii) Scenario 3's (c) is as indicated in Table 5	

- (2) **Scenario 1a: Breaks or cuts occurring when the pre-break/neutral temperature was within the RLT -10°F range when a permanent repair is possible.** Repairs can be made at the time of the break/cut by pulling rail ends together with a rail puller without any removal of anchors or clips. Attachment A is used to determine existing and final (repaired) RNT.
- (3) **Scenario 1b: Breaks or cuts occurring when the pre-break/cut neutral temperature was below the RLT -10°F range when a permanent repair is possible by cutting additional rail out.** Repairs can be made at the time of the break/cut by pulling rail ends together with a rail puller without any removal of anchors or clips. Attachment A is used to determine extra rail to cut out, and existing and final (repaired) RNT. If repairs cannot be made by pulling, then see Scenario 2 under (4).
- (4) **Scenario 2: Breaks or cuts occurring, when permanent repairs cannot be made at the time of the break/cut.** If a plug is added (RAIL IS ADDED), or the rail pulled together and bolted as an interim repair, then permanent repairs or adjustments to the RNT shall be made before reaching the rail return temperature in Table 1, and by distressing 780' of rail.

Note that under this Scenario:

- (i) the readjustment here is to RLT (and NOT to RLT-10), and
- (ii) the potential benefit of the single joint interim repair approach versus the plug rail (i.e., offering the 1 weld vs. 2 welds later upon readjustment), and

- (iii) the interim benefit of rail pulled together approach's resetting reduced RNT to the pre-break value.
- (5) **Scenario 3: For “Special Cases”** where breaks or cuts occur:
 - (i) in close proximity on the same rail, or;
 - (ii) near fixed structures, or;
 - (iii) in extremely stiff or frozen rail/ballast conditions.

NOTES:

- (a) **IN THE ABOVE CASES, TABLES IN ATTACHMENT “A” DO NOT APPLY (I.E. PRE-BREAK/CUT RNTs CANNOT BE DETERMINED.)**
 - (b) **SCENARIO 3 ADJUSTMENT OF RLT IS AS GIVEN IN SCENARIO 2 (I.E. REQUIRING RETURN TEMPERATURES AS PER TABLE 1, AND UNFASTENING/DISTRESSING 390' OF RAIL ON EITHER SIDE OF THE BREAK/CUT, OR 780' TOTAL, WITH THE EXCEPTION OF (iii) WHICH ADOPTS TABLE 5 FOR DISTRESS LENGTHS). SEE BELOW.**
- (d) **Recommended Procedures to Readjust Rail RNT.** The procedures used to readjust rail after a break and/or service failure or cut are given below for the above Scenarios:
- (1) **Scenario 1a: Single Break/Cut Occurred when the RNT was Within 10° of the RLT (105°-10=95°F), when a permanent repair is possible at the time of break/cut. Note the following:**
 - (i) **Rail can be pulled together through the anchors or fasteners and the gap can be closed. A minimal amount of anchors are removed around the service failure and/or at the cut in CWR.**
 - (ii) **Permanent repair is made when service failure is discovered or CWR is cut.**
 - (iii) **RNT is restored to within the range of RLT -10°F.**
 - (iv) **No rail is added.**
 - (v) **No additional repairs are required (except for repositioning displaced anchors/fasteners resulting from rail pulling).**
 - (vi) **Following are the steps to be followed when making a repair:**
 - Step 1: Obtain the rail temperature at the time of the break/cut, gap size, rail size, tie type (wood or concrete), anchor/fastener type, and the anchor pattern (every tie versus every other tie) and record on Form “TD.”
 - Step 2: Use Table 2 above to determine which table in Attachment A should be used to determine the pre-break/cut RNT.
 - Step 3: determine if the pre-break/cut temperature is within 10°F of the RLT. If so, proceed to Step 5.
 - Step 4: If not, proceed to Scenario 1b or 2 depending upon the conditions.
 - Step 5: No adjustment is required for breaks or cuts that occurred when the pre-break/cut RNT was within the RLT -10°F. The gap can be closed using the following procedures:
 - Remove a limited number of anchors or fasteners (~5-10 ties) either side of the break/cut (to facilitate an easier rail pull).
 - Cut 1" for the weld allowance if the rail ends are to be welded.

- Use a rail puller to close the gap or to leave the 1" weld allowance. If the gap closes, apply joint bars or make the weld and record all pertinent data.
 - If the gap does not close, close the gap by adding a plug rail. Record the gap size, temperature, and the rail added, and return later to readjust using Scenario (2).
 - After applying joint bars or making the weld, record the gap size, pre-break/cut RNT, the restored RNT and rail temperature on Form "TD." Permanent repairs at the service failure, break and/or cut location shall be made within 30 days in accordance with FRA §213.119(c)(3).
 - If working in a curve, proceed to check alignment to be sure rail has not chorded in after pulling rail with a rail puller. Realign if necessary.
- (vii) **Above procedure requires pulling rail through the anchors or fasteners; hence, needing sufficient puller/tensor capacity especially in concrete tie track or on wood ties with elastic fasteners. If puller capacity is not adequate or puller is not available, use procedures in Scenario 2**
- (viii) **MassDOT Rail and Transit Division requires that all permanent repairs that can be made immediately (Scenario 1), be accomplished by adjusting RNT to at least RLT -10°F or 95°F.**
- (ix) **ILLUSTRATIVE EXAMPLE OF SCENARIO 1a:**

Consider a rail break or defect removal on wood tie, every other tie anchored (EOTA) 136# rail segment, when the rail broke/cut at 40°F, and the resulting gap size is 3 inches. How to make the repair/readjustment?

ANSWER: from Table 1a (ATTACHMENT "A") the pre-break cut RNT is: 99°F. This is within MassDOT's RLT-10 safe range (i.e. within 105 – 10), hence a candidate for Scenario 1a! After cutting an extra inch for the weld allowance, close the gap to the 1" weld gap via rail puller (without any anchor removal), and proceed to make the weld. Record all pertinent data, and be sure to reposition any moved/displaced anchors. Then the readjusted RNT here is 99°F.

Note: if for any reason the rail could not be pulled together, proceed to make an interim repair via a plug rail requiring adding 3" of rail, and then apply Scenario 2 to readjust before rail temperature exceed 110°F (as per Table 1)

- (2) **Scenario 1b: Single Break/Cut RNT is below the RLT -10°F Range (<95°F), when a permanent repair is still possible. Note the following:**
- (i) This is a modification of Scenario 1a as it requires more rail to be cut out to compensate for the RNT being below RLT -10°F. As such, this requires pulling rail together through "*larger*" gaps. The gap now consists of the sum of present break/cut gap, and the additional rail removal required to compensate for pre-break/cut RLT being below RLT -10°F as well as the 1" weld allowance if field welding. The **Required Steps When RNT is below RLT -10°F Range (<95°F):**
 - Step 1: Measure/record the rail temperature at the time of the break/cut, gap size, rail size, tie type (wood or concrete), anchor/fastener type, and the anchor pattern (every tie versus every other tie) and record on Form "TD."

- Step 2: Use Table 2 information to choose appropriate table in Attachment A to determine the pre-break/cut RNT.
- Step 3: Determine if the pre-break/cut temperature is below the RLT -10°F. If so proceed to Step 4. If above the RLT -10°F range, proceed to Scenario 1a depending on the conditions and schedule readjustments in compliance with the rail return temperature in Table 1. **Step 4: Use the selected table in Attachment A to determine the additional amount of rail to cut out to readjust to at least 95°F.** Add this amount rail to be removed to the existing gap size plus the 1" weld allowance, if a weld is to be made. This is known as the final pull-gap amount (i.e., FG.).
- Step 5: Determine if FG is *pullable*, with the rail puller on site, to the 1" gap required for welding or closing the gap if joint bars are to be added; remembering that rail is to be pulled through the anchors/fasteners without removal. If gap is pullable, proceed to Step 6.
- Step 6: Cut out additional rail required for expansion and closing the joint by adding joint bars or by field welding. Pull rail through the anchors to close the gap for joint bars and/or leave 1" to close with a field weld.
- Step 7: If required gap cannot be closed, there are two possible temporary repairs. They are:
 - Only close the gap that was found in the field when the rail broke and/or was cut. The RNT will be the existing RNT when the rail broke and/or was cut as determined from Attachment A. Return to make permanent repair in accordance with Scenario 2 and Step 8.
 - If initial gap observed when rail broke and/or was cut cannot be closed, add rail by installing a plug rail. The RNT will be the existing rail temperature when the rail broke and/or was cut. Return to make permanent repair in accordance with Scenario 2.
- Step 8 After making permanent repairs as in Step 6, inspect fasteners and readjust (reposition anchors) where necessary so they are tight against the tie.
- Step 9: If working in a curve, proceed to check the alignment to determine if the rail has chorded in. Realign if necessary and or take appropriate remedial action.

(3) ILLUSTRATIVE EXAMPLE OF SCENARIO 1b:

Consider a 136# rail is cut for a defect removal at a rail temperature of 20°F in an every tie fastened rail segment resulting in a rail gap of 2". The territory's designated laying temperature is 105°F. How to make readjustment in line with the RLT-10 criterion at the time of defect cut?

Answer: apply Scenario 1b (as illustrated below)

Table 2a. 6-in base rail
Every tie anchored

Rail Break Temp	Rail Gap																	
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9
60	90	102	111	117	120	133	144	149	154	159								
55	85	97	106	111	116	128	139	144	149	154	156							
50	80	92	101	105	110	121	131	136	141	146	151	153						
45	75	87	96	100	104	115	124	129	134	139	144	148	152	156				
40	70	82	91	95	100	111	120	124	129	134	139	143	147	151	155			
35	65	77	86	90	94	105	114	119	124	129	133	137	141	145	149	153		
30	60	72	81	85	90	101	110	114	119	124	128	132	136	140	144	148	151	
25	55	67	76	80	84	95	104	109	114	119	124	128	132	136	140	144	148	151
20	50	62	71	75	79	89	99	104	109	114	119	123	127	131	135	139	143	146
15	45	57	66	70	74	85	94	99	104	109	114	118	122	126	130	134	138	141
10	40	52	61	65	69	79	88	93	99	104	109	113	117	121	125	129	133	136
5	35	47	56	60	64	74	83	88	94	99	104	108	112	116	120	124	128	131
0	30	42	51	55	59	69	78	83	89	94	99	103	107	111	115	119	123	126
-5	25	37	46	50	54	64	73	78	84	89	94	98	102	106	110	114	118	121
-10	20	32	41	45	49	59	68	73	79	84	89	93	97	101	105	109	113	116
-15	15	27	36	40	44	54	63	68	74	79	84	88	92	96	100	104	108	111
-20	10	22	31	35	39	49	58	63	69	74	79	83	87	91	95	99	103	106
-25	5	17	26	30	34	44	53	58	64	69	74	78	82	86	90	94	98	101
-30	0	12	21	25	29	39	48	53	59	64	69	73	77	81	85	89	93	96
-35	-5	7	16	20	24	34	43	48	54	59	64	68	72	76	80	84	88	91
-40	-10	2	11	15	19	29	38	43	49	54	59	63	67	71	75	79	83	86
-45	-15	-3	6	10	14	24	33	38	44	49	54	58	62	66	70	74	78	81

Pre break RNT is 79°F hence NOT in the RLT-10 safe range of 95 to 105°F. BUT 99°F at a 3.5" gap is! Hence cut an extra 1.5" leaving a new gap of 3.5". Cut an additional 1" for the weld allowance; pull rail to close gap to 1" without fastener removal and weld. This rail has been readjusted to 99°F and to within the RLT-10 range as required!

(e) **Procedures to Readjust Rail RNT for Scenario 2**

- (1) Scenario 2: Breaks or cuts occurring when permanent repairs cannot be made at the time of the break/cut. If a plug is added as an interim fix, then permanent repairs or adjustments to the RNT shall be made before reaching the rail return temperature in Table 1.
 - (i) Step 1: Use Attachment A Tables to document pre-break RNTs.
 - (ii) Step (2): **If a plug rail is cut in, record the amount of rail added on Form "TD."**
 - (iii) Step (3): A special requirement of Scenario 2 is to distress by removing anchors or clips on 390' of CWR on both sides of plug or joint (for a total of 780') when returning for repair, and readjusting to RLT of 105 °F (and not to RLT-10)

(2) ILLUSTRATIVE EXAMPLE OF SCENARIO 2:

Example: a 136# rail is cut for a defect removal at a rail temperature of 20°F in a concrete tie territory resulting in a rail gap of 2". The territory's designated laying temperature is 105°F. Scenario 1b was attempted but the rail could not be pulled together to close the 3.5" gap (see example above). How to proceed?

ANSWER: follow Scenario 2 (with Options 1 or 2 below):

OPTION 1 - in case rail could not be pulled together to close the 3.5" gap, the procedure is to apply Scenario 2. This requires recording/documenting all pertinent data, and making Interim plug repair of adding 2" of rail and applying Table 1 to establish return temperature for adjustment (i.e. in this case prior to rail temperatures exceeding 110°F). Return at or prior to this rail temperature and make adjustment as per Scenario 2 which requires adjustment by distressing via unfastening ± 390 ft of rail (total of 780 ft).

OPTION 2 - instead of making interim plug repair of adding 2" of rail as per above, consider pulling rail together through the 2" gap (without unfastening) and closing rail via bolted joint. This restores RNT to 79°F. It is still required to return for a later adjustment, but Table 1 doesn't apply anymore in this case, hence more flexibility on when to return for the final adjustment. The required unfastening length is still ± 390 ft (780 ft total).

Note: Option 2 has the benefit of some immediate *partial RNT restoration* (thereby offering some interim safety against a buckling potential during the onset of warm temperatures), and an easier final adjustment of requiring one weld versus two.

(f) **Procedures to Readjust Rail RNT for Scenario 3 (Special Cases) when:**

- (1) Case 1: Multiple breaks/cuts occurring in "close" proximity on the same rail (i.e., within 800' of each other).
- (2) Case 2: Breaks/cuts within 400' of "fixed structures/locations."
- (3) Case 3: Breaks/cuts in iced rail/frozen ballast conditions.
- (4) Case 4: Where the break/cut occurs on both rails within 200' of each other.
- (5) For detailed readjustment procedure for Special Cases 1 and 2 above refer to conventional distressing procedure and application of Scenario 2 as in (e) above, requiring the adjustment of 780' of rail and cutting rail out as dictated by the temperature differential (TD).
- (6) Use Table 4 below with the caveat that additional rail removal may be required if the end points at ± 390 are measured to be moving in when applying the rail puller to close the gap.

Table 4. Special Cases: Additional Rail to Remove for Readjustment for the 780' of Unfastening Length

Temperature Differential (°F)*	Additional Rail to Remove (inches)
5	1/4
10	1/2
15	1
20	1-1/4
25	1-1/2
30	1-3/4
35	2-1/4
40	2-1/2
45	2-3/4
50	3-1/4
55	3-1/2
60	3-3/4
65	4
70	4-1/2
*MassDOT Rail and Transit Division Preferred Rail Laying Temperature (RLT=105°F)	

Note: The above procedures for Scenario 2 and Scenario 3's Special Cases 1 and 2 are based on best practice engineering assumption, that for all rail break/defect cut/pull-apart cases, one unfastening length of 390' on either side of the cut/break is adequate for readjustments. Although some break/cut influence zones can be longer, hence requiring longer unfastening lengths, the 780' total length is an acceptable "best practice" compromise. For "bad" breaks (i.e., break gaps exceeding 3"), longer unfastening lengths are recommended. Additionally, note that the above Scenario 2 procedure readjusts to RLT instead of the RLT -10°F value! This is for "added safety" to counteract the "one unfastening length of ± 390' satisfying all break/cut influence zone" assumption.

- (g) **Procedures to Readjust Rail RNT Scenario 3:** For Special Case 3 (breaks/cuts in frozen rail/ballast conditions):
- (1) Apply Scenario 2 as per (e) above; however, the recommended unfastening lengths are reduced as per Table 5 below.
 - (2) Use Form "RC" in Attachment E to calculate the required expansion amounts that correspond to the unfastening lengths given in Table 5.

Table 5. Unfastening Lengths for Frozen Ballast Conditions

Measured Gap Size (in) when Broke/Cut	Unfastening Length (ft) in Each Direction
<1/2	100
½ - 1	150
>1	200

- (h) **Procedures to Readjust Rail RNT Scenario 3:** For Special Case 4 where the break/cut occurs on both rails within 200' of each other.
- (1) Use Scenarios 1-3 as applicable for rail breaks on each individual rail.
 - (2) The return/readjustment time (return rail temperature) given in Table 1 is not applicable for this Special Case 4 when both rails have breaks in close proximity (within 200' of each other).
 - (3) The following formula must be used to determine the "return rail temperature."

$$T_{RETURN} = (T_{RB1} + T_{RB2})/2 + 70^{\circ}F$$

Where T_{RB1} is the rail break temperature of one rail, and T_{RB2} is the rail break temperature of the other (opposite) rail.

- (4) **Example:** One rail breaks or is cut for defect removal at 10°F and left for a later adjustment in line with Scenarios 2 or 3. The other rail breaks or is cut later at 30°F which is also deferred for later return adjustment. If both repairs were not made at the time of the rail break and/or cut, but were deferred to at a later date, then the return temperature is at/below a rail temperature of 90°F. The calculation is shown below:

$$T_{RETURN} = (10^{\circ}F + 30^{\circ}F)/2 + 70^{\circ}F \text{ or } 20^{\circ}F + 70^{\circ}F = 90^{\circ}F$$

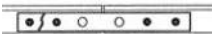






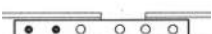
Note that this is a lower return temperature than either individual breaks/cut temperature given by Table 1.

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ATTACHMENT D

**JOINT DEFECT GUIDELINES / MAXIMUM ALLOWABLE
TEMPORARY SPEED RESTRICTIONS (TSR's)**

Joint Defect Guidelines in CWR Track

Condition	FRA Part 213 Reference	Illustration****	Action
One Broken Joint Bar Not Between Middle Holes	§213.121(b) §213.121(e)		10F/15P MPH* (per FRA §213.9(b))
One Broken Joint Bar Between Middle Holes	§213.121(c)		Out of Service until Repaired (per FRA §213.9(b)) and Visually Supervise**
Both Joint Bars Broken Not Between Middle Holes	§213.121(b) §213.121(e)		10F/15P MPH* (per FRA §213.9(b))
Both Joint Bars Broken Between Middle Holes	§213.121(c)		Out of Service until Repaired (per FRA §213.9(b)) and Visually Supervise**
Less than Two Bolts in Rail End	§213.121(e)		10F/15P MPH* (per FRA §213.9(b))
Unbolted Rail End Pulled Apart 1-1/2" - 2"	§213.121(e)		Inspect (per FRA §213.9(b)) Repair within 24 hrs.
Unbolted Rail End Pulled Apart 2" - 4"	§213.121(e)		Visually Supervise** Must maintain continuous communications w/train crew (per FRA §213.9(b)) Repair within 24 hrs.
Unbolted Rail End Pulled Apart >4"	§213.121(e)		Out of Service until Repaired
Notes: * All speeds shown are maximum allowable. Qualified employees may impose more stringent remedial action (FRA §231.7(a)(b)(c)(d)), depending on the presence of a combination of defects or particular site conditions. ** "Visually supervise" means that an employee qualified under FRA §213.7(a)(b)(c) must observe each operation over the defect and/or in accordance with FRA §213.7(d). *** Solid circle is bolt hole with bolt. Open circle is bolt hole without bolt. **** Track surface and joint tie conditions shall be considered when determining temporary slow order (TSO) maximum speeds.			

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ATTACHMENT E

PREPARATION OF FORMS

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**FORM “TD”
REPORT OF DISTURBANCE OF CWR TRACK**

Part A: CWR Track Disturbance Due to Track Work						
Route:		Date:		Rail Temp		Time:
M.P. Location From:		To:		Track No:		
Type of Work Performed:						
Additional Repairs Required:						
Remedial Action Required:						
Part B: Rail Cut Or Service Failure in CWR Territory						
Route:		Date:		Rail: North / South / East / West		
M.P. Location From:		To:		Track No:		
Type of Work Performed:						
Additional Repairs Required:						
Remedial Action Required:						
Operating Railroad Employee (Print):						
Operating Railroad Employee (Signature):						

ATTACHMENT E

**INSTRUCTIONS FOR PREPARATION OF THE
REPORT OF DISTURBANCE OF CWR TRACK (FORM “TD”)**

A report of disturbed track , Form “TD”, shall be made out as required by Section 10.0. The report will be completed and signed by the Contractor/Operating Railroad Employee in charge of the work as follows:

Part A - This part will be completed in its entirety any time heavy maintenance work is performed on CWR track. See Section 6.0, “Trackwork that Disturbs CWR Track and the Protection of Disturbed Track” for the information required on Form “TD”, Part A.

Part B - This part will be completed any time main track CWR is cut or broken and/or there is a service failure.

- A. See Section 5.0, “Maintenance of the Desired Rail Neutral Temperature in Previously Installed CWR” for the information required on Form “TD”, Part B.
- B. See Attachment C, “Recommended Procedures for Readjusting Continuous Welded Rail (CWR), After a Break, Pull-Apart (Service Failure) or Cut Below the Target Rail Laying Temperature (105°F)” for the information required on Form “TD”, Part B.
- C. See Attachment A, “Determination of Estimate of Pre-Break/Pre-Cut Neutral Temperature for a Service Failure in CWR” for the information required on Form “TD”, Part B.

Parts A & B

- A. Form “TD” shall be filled out in accordance with Section 10.0, “Reporting Requirements for CWR Track.”
- B. Form “TD” shall be filled out and kept by the Operating Railroad in accordance with Section 11.0, “Record Keeping.”

**FORM “TM”
REPORT OF TRACK MOVEMENT: CURVES $\geq 3^\circ$**

Route:		Type of Work Performed*:	Surfacing <input type="checkbox"/>	Install Ties <input type="checkbox"/>	Date of Work:	
M.P. Location :	From:		To:		Track No:	
Curve No:			Degree of Curve:		Elevation:	
Rail Temperature at which Surfacing Tie Installation was Done:						

**Distance from Reference
(Reference Points Must be no Further than 200 ft. apart):**

Reference Point Number	Location of Reference Point	Before Work	After Work	Movement	Within 7 Days	Movement
TS (Tangent to Spiral Tag)						
SC (Spiral to Curve Full Body Tag)						
Additional Full Body Tag As Required**						
Additional Full Body Tag As Required**						
CS (Curve to Spiral Full Body Tag)						
ST (Spiral to Tangent Tag)						
Uniform Movement	-----	-----				

*Types of work that requires a Form “TD.” Out-of-face surfacing and alinement and installing more than 540 ties per mile.

Railroad Employee Making Measurements (Print Name): _____

Railroad Employee Making Measurements (Signature): _____

Railroad Employee in Charge of Surfacing (Print Name): _____

Railroad Employee in Charge of Surfacing (Signature): _____

**Use additional sheets if the number of stations exceeds the number of lines.

ATTACHMENT E

INSTRUCTIONS FOR PREPARATION OF THE REPORT OF TRACK MOVEMENT
DUE TO SURFACING OR OUT-OF-FACE TIE RENEWAL
(FORM "TM")

- (a) In curves of 3° or over, prior to the start of high speed surfacing, or installing more than 540 ties per mile, the Operating Railroad and/or Contractor shall set reference points each curve at the locations given on Form "TM" along the gage side of the high rail of the curve.
In no case may the points be more than 200' apart.
- (1) In no case will the points be more than 200' apart.
- (2) In addition, offset stakes shall be set at each of the reference mark locations. These stakes will be set to the outside (high side) of the track, and out of the way of regulators or other equipment.
- (3) In multiple track locations, a mark on the high rail or a tack in a tie on an adjacent and/or parallel track, may be used as an offset location.
- (4) Adjacent and/or parallel tracks may be used for offset locations only if the track is not to be disturbed or will have any maintenance work performed when it is being used as for offset locations.
- (5) Initial measurements shall be made from the reference points to the offset locations before any heavy maintenance work (The "Work") is performed and shall be recorded on Form "TM".
- (b) Immediately after completion of the Work, the Operating Railroad Employee in charge of the track surfacing or tie installation will again measure and record the distances from the reference point to the offset locations. Both the distances and any movement shall be recorded on Form "TM".
- (c) Within seven days after the Work, the Operating Railroad will again measure and record the distance from the reference point to the offset locations. Again, both distances and movement shall be recorded on Form "TM".
- (d) If the curve has moved and/or chorded in at any location is 3" or more ($\geq 3"$), the curve shall be distressed by lining out and/or distressing the rail prior.
- (e) The lining out of the curve and/or distressing of the curve shall be accomplished before:
- (1) If the ambient temperature is greater than 80°F (rail temperature greater than a temperature of 110°F), no work shall be done unless it is an emergency or as directed by MassDOT Rail and Transit Division and; or
- (2) If the ambient temperature and/or rail temperature is less than 40°F, all work will be suspended unless it is an emergency or directed by the MassDOT Field Representative.
- (f) **Temporary Speed Restriction:** A temporary speed restriction (TSR) shall be placed if the curve has moved inward 3" or more in accordance with Section 6(e), until the curve is lined out and/or distressed. The curve will be considered to have lost its neutral temperature if movement is recorded as given below:

Curves 3° and Over	Measured Curve Movement that Requires Lining Out the Curve and/or Distressing the Rail
	3" or greater ($\geq 3"$) to the inside

**FORM “JE”
REPORT OF JOINT ELIMINATION BY FIELD WELDING
THERMITE (T) / FLASH BUTT (FB)**

Track Name/No.	Rail (N/S/E/W)	MP	Rail Weight	Date/ Weld No.	Field Weld Type ⁽²⁾	Mold Date	Portion Date	Weld Company/ Welder's Name	Weather/ Rail Temp °F	Rail Cut Out / or Consumed and/or Added (Inches)	Remarks	Weld Inspections			Results
												Date Inspected	Inspection Company	Test Results	

Notes:
 (1) Reason for weld:
 EJ – Eliminate Joint
 EPR – Eliminate Plug Rail
 EDW – Eliminate Defective Weld
 RNT – Increase Rail Neutral Temperature
 (2) Field Weld Types:
 T – Thermite
 FB – Flash butt
 (3) A Form “TD” shall be made out when rail is cut and/or broken.

Operating Railroad Contractor's Signature: _____ Date: _____

Operating Railroad Contractor's Name (Print): _____

ATTACHMENT E

**INSTRUCTIONS FOR THE PREPARATION OF THE REPORT OF JOINT ELIMINATION BY FIELD WELDING
(FORM "JE")**

- (a) A Report of Joint Elimination by Field Welding shall be made out as required in Section 10.0. The report shall be completed by the Contractor/Operating Railroad Employee in charge of the work.

FORM “RC” REPORT OF RAIL CLIPPING/ANCHORING

Operating Railroad/Contractor:	Weather:
Line Segment:	Copy sent to MassDOT Rail and Transit Division (Yes/No)”

Date	Rail ⁶	String Number	Start MP	End MP	String Length (Feet)	Rail Temp (°F) ⁽¹⁾	Required Temp. Change (°F) ⁽²⁾	Required Expansion (Inches) ⁽³⁾	Method of Expansion ⁽⁵⁾	String Vibrated (Y/N)	Time Started/ Finished Clipping	Actual Expansion Recorded (Inches) Obtained at ¼ Points ⁽⁴⁾				Notes
												1/4	1/2	3/4	Full	

Notes:

- (1) Temperature to be measured with approved rail thermometer.
- (2) Required temperature change in °F is preferred RNT of 105°F minus the actual rail temperature at the time of expansion.
- (3) See formula and table on reverse side of Form.
- (4) After string is anchored and/or clipped.
- (5) Method of Expansion: Natural (N); Rail Heater (RH); Rail Puller (RP); Cooled (C).
- (6) Rail locations” N, S, E, W

Operating Railroad Contractor’s Signature: _____ **Date:** _____

Operating Railroad Contractor’s Name (Print): _____

ATTACHMENT E

INSTRUCTIONS FOR THE PREPARATION OF THE REPORT OF RAIL CLIPPING/ANCHORING (FORM “RC”)

Formula for Coefficient of Linear Expansion of Rail:

$$A = 0.000078 \times (T_D - T_E) \times L$$

- A = Adjustment or Required Expansion amount for rail string (in inches)
 T_D = Desired RNT which should be 105°F if possible as conditions permit
 T_E = Existing or Actual Rail Temperature (°F) prior to heating or expansion measured with an approved rail thermometer
 L = Length of string to be adjusted (in feet)

Calculations:

Change in Rail Length Due to Change in Rail Temperature																
A = Change in Rail Length in Inches = $0.000078 \Delta T \times L$ L = Length of Rail to be Expanded in Feet ΔT = Change in Temperature in Degrees Fahrenheit: Desired RNT minus Actual Rail Temperature																
Length of Rail (ft)	Change in Temperature in Degrees Fahrenheit															
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Change in Rail Length in Inches																
100	1/8	1/8	1/8	1/4	1/4	1/4	3/8	3/8	3/8	1/2	1/2	1/2	5/8	5/8	5/8	5/8
200	1/8	1/4	1/4	3/8	1/2	1/2	5/8	5/8	3/4	7/8	7/8	1	1-1/8	1-1/8	1-1/4	1-1/4
300	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8	1-7/8
400	1/4	3/8	1/2	5/8	7/8	1	1-1/8	1-1/4	1-1/2	1-5/8	1-3/4	1-7/8	2-1/8	2-1/4	2-3/8	2-1/2
500	1/4	1/2	5/8	7/8	1	1-1/4	1-3/8	1-5/8	1-7/8	2	2-1/4	2-3/8	2-5/8	2-3/4	3	3-1/8
600	1/4	1/2	3/4	1	1-1/4	1-1/2	1-3/4	1-7/8	2-1/8	2-3/8	2-5/8	2-7/8	3-1/8	3-3/8	3-5/8	3-3/4
700	3/8	5/8	7/8	1-1/8	1-3/8	1-3/4	2	2-1/4	2-1/2	2-3/4	3-1/8	3-3/8	3-5/8	3-7/8	4-1/8	4-3/8
800	3/8	5/8	1	1-1/4	1-5/8	1-7/8	2-1/4	2-1/2	2-7/8	3-1/8	3-1/2	3-3/4	4-1/8	4-3/8	4-3/4	5
900	3/8	3/4	1-1/8	1-1/2	1-7/8	2-1/8	2-1/2	2-7/8	3-1/4	3-5/8	3-7/8	4-1/4	4-5/8	5	5-3/8	5-5/8
1000	1/2	7/8	1-1/4	1-5/8	2	2-3/8	2-3/4	3-1/8	3-5/8	4	4-3/8	4-3/4	5-1/8	5-1/2	5-7/8	6-1/4
1100	1/2	7/8	1-3/8	1-3/4	2-1/4	2-5/8	3-1/8	3-1/2	3-7/8	4-3/8	4-3/4	5-1/4	5-5/8	6-1/8	6-1/2	6-7/8
1200	1/2	1	1-1/2	1-7/8	2-3/8	2-7/8	3-3/8	3-3/4	4-1/4	4-3/4	5-1/4	5-5/8	6-1/8	6-5/8	7-1/8	7-1/2
1300	5/8	1-1/8	1-5/8	2-1/8	2-5/8	3-1/8	3-5/8	4-1/8	4-5/8	5-1/8	5-5/8	6-1/8	6-5/8	7-1/8	7-5/8	8-1/8
1400	5/8	1-1/8	1-3/4	2-1/4	2-3/4	3-3/8	3-7/8	4-3/8	5	5-1/2	6-1/8	6-5/8	7-1/8	7-3/4	8-1/4	8-3/4
1440	5/8	1-1/8	1-3/4	2-1/4	2-7/8	3-3/8	4	4-1/2	5-1/8	5-5/8	6-1/4	6-3/4	7-3/8	7-7/8	8-1/2	9
1600	5/8	1-1/4	1-7/8	2-1/2	3-1/8	3-3/4	4-3/8	5	5-5/8	6-1/4	6-7/8	7-1/2	8-1/8	8-3/4	9-3/8	10

FORM “CWR”

REPORT OF SEMI-ANNUAL INSPECTION (SPRING/FALL) OF CWR TRACK

Operating Railroad/Contractor:	Weather:
Line Segment:	Copy sent to MassDOT Rail and Transit Division (Yes/No):

Track No.	Rail (N/S/E/W)	MP (Start)	MP (Finish)	Ties		Ballast		Anchors			Longitudinal Rail Movement					Remarks/ Remedial Action Required
				Type	Condition	Crib	Shoulder	Type	Pattern	Position	Turnouts	Crossovers	Grade X-ings	Open Deck Bridges	Other	

Operating Railroad Contractor's Signature: _____ Date: _____

Operating Railroad Contractor's Name (Print): _____

ATTACHMENT E

**INSTRUCTIONS FOR THE PREPARATION OF THE
REPORT OF SEMI-ANNUAL INSPECTION (SPRING/FALL) OF CWR TRACK
(FORM “CWR”)**

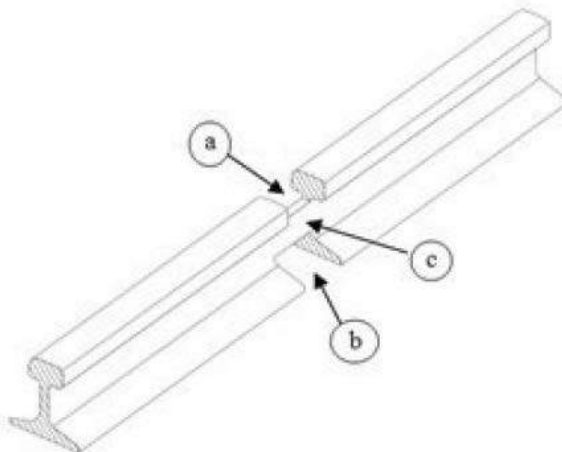
- (a) A Report of Semi-Annual Inspection (Spring/Fall) of CWR Track shall be filled out as required in Section 10.0. The report shall be completed by the Operating Railroad Employee making the inspection.

ATTACHMENT F

TORCH CUTTING RAIL (FIGURE/REMARKS)

- (a) General: Cutting Continuous Welded Rail (CWR) In Compression:
 - (1) Cut rail with a torch any time the existing rail temperature is suspected of being above the Rail Neutral Temperature (RNT) and/or the rail is in tension.
 - (2) Rail in compression has many forms to include:
 - (i) Tight rail
 - (ii) Nervous/wavy rail
 - (iii) Kinky rail
 - (iv) Misaligned track
 - (v) Buckled track
 - (3) The area where the rail is in compression may exhibit the following characteristics:
 - (i) Rail is lifting out of the tie plates; or,
 - (ii) Rail is bunching and/or crowding shoulders of the tie plates; or,
 - (iii) Rail is moving longitudinally in anchors and/or elastic fasteners; or,
 - (iv) Ties are skewing; or,
 - (v) Crib and/or shoulder ballast is pushing due to longitudinal and/or lateral track movement; or,
 - (vi) There are numerous consecutive high spikes; or
 - (vii) The rail appears to be kinking; or
 - (viii) One rail appears to be straighter than the other opposite rail; or
 - (ix) There is noticeable variation in track gage.
- (b) The Contractor and Operating Railroad shall have their own specific Safety Procedures developed for torch cutting rail.
- (c) The Contractor and/or Operating Railroad shall designate personnel that are qualified and are trained on an annual basis to torch cut rail using the above Safety Procedures.
- (d) Minimum Recommended Procedures When Torch Cutting CWR:
 - (1) Locate the area where the rail appears to be in compression; and
 - (2) If the track is already misaligned and/or buckled:
 - (i) Line track out at misalignment and/or buckle to reduce compressive stresses in the rail; and
 - (ii) Make cut away from misalignment and/or buckle area to make cut in an area of potentially reduced compressive forces.
 - (3) In all cases, make the torch cut, as shown below, before removing any spikes, lags or fasteners; and
 - (4) In all cases, make the torch cut, as shown below, before removing any joints and/or anchors or elastic fasteners; and,
 - (5) In all cases, make the torch cut in the rail as described and shown below.
- (e) Torch Cutting Rail In Compression: Use the so called “H” Pattern Method:
 - (1) First, cut and remove the rail head as shown in “a”; then

- (2) Second, cut and remove both sides of the base as shown in “b”; then
- (3) Third, cut and remove the remaining portion of the web from the top of the web near the rail head towards the base of the rail as shown in “c”.
- (4) Note: Removing the rail head and then both sides of the rail base, before removing the web of the rail, is preferred, in order, if possible, to minimize excessive vertical and/or lateral movement of the rail when the rail is cut.



- (f) After Torch Cutting Rail:
- (1) If the rail that is torch cut is to be field welded and/or jointed:
 - (i) Trim or cut back the torch cut rail ends with a rail saw.
 - (ii) Remove all indication of the torch cut and/or heat affected zone which can be accomplished by:
 - Cutting back a minimum of 2" behind the torch cut on each rail end (AREMA Chapter 4); and/or
 - Cutting back the heat affected zone from behind the torch cut on each rail end;
 - Use whichever cut back amount is larger.
 - (iii) Also see Attachment B, Paragraph (g) "Torch Cutting CWR in Track."

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APPENDIX D

PAN AM MANUAL FOR TRACK MAINTENANCE AND CONSTRUCTION

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APPENDIX

Standard Plans .

SCOPE OF MANUAL

- (a) This manual provides practical standards for the construction and maintenance of track. It is for the guidance of Engineers of Track, Supervisors of Track, Track Foreman, Track Inspectors, other Maintenance of Way and Engineering Department Forces, Contractors and others affected with constructing and/or repairing tracks or facilities on GRS properties. This manual must be used in conjunction with standard plans and practices.
- (b) It is not the intent of this manual to establish arbitrary procedures or values, but rather to serve as a guide, which must be considered in the light of experience and the requirements of the service.

SEC. 33.0 DRAINAGE

- (a) Drainage is of prime importance for efficient maintenance of track. Water mixing with materials of the roadbed tends to make the entire track structure unstable in varying degrees, depending on the kind of material and the quantity and flow of water.
- (b) Water seeping or flowing toward the track should be directed across the roadbed or be intercepted and diverted before it reaches the roadbed.
- (c) Water falling upon the roadbed should be quickly drained.
- (d) Adequate cross drains should be maintained particularly where bridges, road crossings, and sags interfere with longitudinal drainage.
- (e) Each drainage or other water carrying facility under or immediately adjacent to the roadbed must be maintained and kept free of obstruction to accommodate expected water flow for the area concerned.

SEC. 35.0 CROSS SECTION

Roadbeds, embankments and excavations should be constructed in accordance with standard cross sections and thereafter so maintained. The approved ballast section is depicted in Chapter 1 of the AREMA Manual for Railway Engineering except the ballast shoulder width is 12 inches.

Deviation from approved cross sections should not be made without authorization by the Principal Engineer.

SEC. 37.0 VEGETATION

- (a) Growth of vegetation should be encouraged on slopes of embankments, cuts and deep ditches to prevent erosion.
- (b) Vegetation on railroad property, which is on or immediately adjacent to roadbed, must be controlled so that it does not:
 - a. Become a fire hazard to track-carrying structures.
 - b. Obstruct visibility of railroad signs and signals.
 - 1. Along the right-of-way
 - 2. At highway-rail crossings
 - c. Interfere with railroad employees performing normal trackside duties.
 - d. Prevent proper functioning of signal and communication lines; or
 - e. Prevent railroad employees from visually inspecting moving equipment from their normal duty stations.

SEC. 39.0 SIGNS AND POSTS

Track signs and posts must be placed and maintained in accordance with Standard Plans and Special Instructions. They should be maintained in their proper places and kept plumb. Missing signs or posts should be reported to the Supervisor of the territory, who will then arrange for their replacement.

SEC. 41.0 HIGHWAY GRADE CROSSINGS (Refer to AREMA Volume 1, Chapter 5, Part 8.)

SEC. 41.1 AUTHORITY FOR PROTECTION

Public grade crossings shall be protected according to degrees of hazard, State statutes, Township and Municipal ordinances and Public Service Commission regulations with the sign or device approved by the governing body. (Reference: the M.U.T.C.D. Manual)

SEC. 41.2 MAINTENANCE

- (a) All signs and other forms of protection at grade crossings must be immediately repaired or replaced when damaged.
- (b) Crossings should be kept clean, and attention given to the following:
 - 1. Drainage, sloping the surface if necessary, and constructing underground drains.
 - 2. Surface water flowing along highway toward the railroad should be diverted before it reaches the tracks.
 - 3. The width of the crossing shall be sufficient to extend at least two (2) feet beyond each edge of the traveled width of the highway.
 - 4. Highway approaches to track areas should be on smooth grades without abrupt breaks, so that low road clearance vehicles carrying large shipments, such as heavy machinery, may pass over the tracks without touching the rails or surface of crossing with their under frames. (Refer to AREMA Part 8. Sec. 8.1.3)
 - 5. Flange ways shall be 21/2 inches wide and not less than 4 inches deep. They must be kept clean at all times.
 - 6. The view in both directions from vehicles approaching the track shall be kept as clear as practicable.
 - 7. When installing or making general repairs to crossings, track alignment on tangents should be fixed by transit line and on curves by transit or string calculations.

SEC. 41.4 CONDUCT OF WORK

Work on highway crossings, public streets and roads shall be done with the least inconvenience possible to highway travelers. Care must be taken to protect the work in compliance with the safety requirements and the law. The most current MUTCD Manual or the AREMA manual should be the reference sources when work impacts grade crossings.

SEC. 43.0 WIRE LINES

SEC. 43.1 COMMUNICATION AND SIGNAL LINES

- (a) When repairing and working on wire lines, all applicable safety considerations must be strictly observed.
- (b) All Maintenance of Way employees must observe the general condition of poles and wires along and across the tracks and right-of-way and report conditions needing correction such as: broken wires, uprooted trees or broken branches in the wires; broken or leaning poles to responsible C&S employees and the Supervisor of Track.
- (c) Trees near wire lines should be kept trimmed, or removed when decayed to such an extent as to be unsafe, to prevent interference with wires, or with the view of signals.

SEC. 53.0 GAGE

SEC.53.1 STANDARDS FOR GAGE

The standard gage for track, measured between the running rails at right angles to the alignment of the track, 5/8 inch below the top of rail, is:

- (a) Tangents:
 - 1. 4 feet 8 1/2 inches.
- (b) Curves:
 - 1. 4 feet 8 1/2 inches up to 13 degrees, inclusive.
 - 2. 4 feet 9 inches over 13 degrees.
- (c) Gage through specially fabricated track-work, such as movable point and slip crossings, shall be that as authorized by the Principal Engineer.
- (d) Gage must remain in compliance with, and must be corrected, prior to reaching the limits of FRA Track Safety Standards, Title 49, Part 213.53. Track will be gaged to the standards in (a) and (b) above, where rail is renewed or out-of-face gaging is performed.
- (e) Changes in prescribed gage should be made in uniform increments of not more than 1/4 inch per 31 feet of track.
- (f) Gage shall be changed by suitable adjustment of the rail opposite the line rail.

SEC. 53.2 MAINTENANCE OF GAGE

- (a) Gage shall be measured with a standard track gage or other authorized device. Track gages must be inspected at frequent intervals for accuracy by the Supervisor-Track. Movement under load (i.e. plate movement) must be added to the gage measurement.
- (b) Provided gage is uniform, the following deviations from that maintained should not be exceeded:
 - 1. In class 4, 5 and 6 track:

Tangents Plus or minus 1/4 inch.
Curves Plus 1/2 inch to minus 1/4 inch.
 - 2. In class 1 through 3 tracks, where the rails are securely fastened to the ties and in correct alignment:
Tangents - Plus 1 inch to minus 3/8 inch
Curves - Plus 1 inch to minus 3/8 inch.

SEC. 55.0 ALIGNMENT

Alignment consists of series of straight lengths of track, referred to as tangents, connected by simple, compound or reverse curves.

SEC. 55.1 MAINTENANCE OF ALIGNMENT

- (a) Outer rails of curves and field side rails on tangents should be selected as the line rails.
- (b) When general alignment is to be corrected, such as the removal of long swings on tangents and the restoration of curves to circular curvature, laying out of spirals, etc., the throws should be determined from field measurements.
 - 1 A transit or rail mounted telescope should be used to determine the corrections required on tangents.
 - 2 The string line method should be used to determine the alignment of curves and to calculate the required corrections throws.
- (c) For detail corrections of irregular line, the required throws may be determined by using a line wire and indicator device, plotting a graph on curves, with automatic lining equipment, or with stakes set by transit by surveyors.
- (d) Alignment must be maintained within the limits prescribed in FRA, Track Safety Standards, Title 49, Part 213.55.

SEC. 55.2 STRING LINING CURVES

- (a) String lining of curves is based on the following principles:
- 1 The mid-ordinates of a curve are indicative of its degree of curvature.
 - 2 The mid-ordinates of a circular curve are equal for chords of uniform length.
 - 3 For practical purposes, the mid-ordinate varies directly with the degree of curvature.
 - 4 Where track is thrown in or out at any single station on the curve, the mid-ordinate of the curve at the station is affected by the amount of the throw and the mid ordinates at the adjacent stations are automatically affected by one-half (1/2) of the amount, but in the opposite direction.
- (b) String lining of curves is a method for determining the most advantageous alignment that can be obtained with reasonable amounts of throw.
- (c) Any of the established mathematical methods, such as the "Bartlett Method" or "Bracket Method", may be used to calculate the throws of curves. All calculations should be checked to ascertain that the calculated throws would actually produce the required changes in mid-ordinates.
- (d) The ARC "Curve-liner" machine is an approved device for mechanically calculating the throw of curves. The operator of the "Curve-liner" machine must be properly trained in its operation.
- (e) Track shall be stationed for string lining on the gage side of the outer (high side) rail of the curve, with stationing marked on the web or base of the rail.
1. Stationing shall begin at a point on tangent sufficiently far ahead to permit the measurement of any reverse curvature or "Dogleg", and continue throughout the curve to a point sufficiently far on the tangent to permit measurement of any reverse curvature on the leaving end.
 2. 31foot stations (62foot chords) should be used for most curves found in main tracks, in which case a mid-ordinate of one (1) inch will indicate one (1) degree of curvature. It may be desirable to use 44foot stations for curves under 30 minutes, or to use 22foot stations for sharp curves.
 3. The practical relationship between station and chord-length, mid-ordinate and degree of curvature for various stationing is shown in the following table:

Degree of Curvature	Station Length	Cord Length	Mid-Ordinate
1 deg. 00'	15' 6"	31'	1/4"
1 deg. 00'	22'	44'	1/2"
1 deg. 00'	31'	62'	1"
1 deg. 00'	44'	88'	2"

- (f) Mid-ordinates should be measured to the gage side of the string in sixteenths (16ths) of an inch.
 - 1. String line holders or offset blocks should be used to position the string a distance of one (1) inch away from the gage line of the rail, so as to permit measurement of any reverse curvature.
 - 2. Mid-ordinate measurements should be taken with the string line pulled taut, not affected by the wind, and with the string line holders and the scale held horizontal and perpendicular to the gage.
 - 3. If a conventional rule is used to measure the mid-ordinate, the actual scale reading should be recorded and a correction made to compensate for the one (1) inch offset of the string line from the rail when calculations are made, to avoid field errors. Direct compensated readings of mid-ordinates may be recorded by the use of a scale similar to that shown in figure 552.
- (g) Track center distances should be measured and recorded at least every five (5) stations in two or more track territory, and more frequently where close track centers are encountered. The distance from centerline of track to any obstruction, which might interfere with the lining of the curve, should be measured and recorded so that limiting throws for these tight spots may be determined.
- (h) The location of both ends of each elevation runoff should be noted so that the relationship between spirals and runoffs can be maintained.

SEC. 55.3

REFERENCING TRACK FOR LINING

- (a) In single-track territory stakes shall be used to mark the desired alignment. Stakes may be used in "Third Rail Territory" or at other locations in multiple track territory where their use may be appropriate.
- (b) A "scratch" board or rod may be effectively used to mark required throws for curves on multiple tracks. These are devices for referencing existing alignment of the track to be lined to an adjacent track, which must not be disturbed until the lining operation has been completed:
 - 1. Scratchboards have one notched end, to be placed on the head of a rail, and have a scribe or sharpened spike on the other end for "scratch marking" ties on the adjacent track. There are usually several notches to permit use of the board on curves having different track center distances. A typical scratchboard is depicted in the standard plans.

2. Stations are seldom directly opposite ties in the adjacent track. Locations on the railhead where the notch is placed must be marked; so that when the track lining operation is performed the board can be placed in the same location as when the scratch marks were made.
3. Scratches are made by placing the board with the selected notch firmly against the inter-track side of the head of one rail, preferably the line rail, at marked locations described in paragraph 2. A scratch mark is then made on the near end of a tie in the adjacent track with the sharpened spike or scriber.
4. Tacks are driven into "scratched" ties at distances equal to the calculated required throws from scratches. Special care must be taken to set the tack in the proper direction from the scratch so that, when track is properly lined in accordance with calculated throws, the point at the scratch end of the board will be directly over the center of the tack head.
5. After the curve is tacked, the same scratch board or rod used to scribe the marks must be left with the person assigned to supervise correction of the alignment, and used throughout the lining operation. The notch end of the board shall be placed on the inter-track side of the head of the rail selected for referencing and the track lined until the point at the scratch end of the board is directly over the center of the tack in the adjacent track.

SEC. 57.0 CURVATURE, ELEVATION AND SPEED

SEC. 57.1 GENERAL

- (a) Elevation, or super elevation, is the vertical distance of the outer rail of a curve above the inner rail. It is provided to overcome or partially overcome the effects of curvature and speed.
- (b) Equilibrium elevation is that which exactly overcomes the effect of negotiating a curve at a given speed for any given degree or curvature, placing the resultant of the centrifugal force and weight of equipment in a direction perpendicular to the plane of the track.
- (c) Underbalance is the amount that an elevation is less than equilibrium elevation for any given combination of speed and curvature.
- (d) Overbalance is the amount that an elevation exceeds equilibrium elevation, and is produced by the operation of a train around a curve at less than equilibrium speed, or stopping on the curve.
- (e) Authorized speed is that specified in the current employee's timetable. Speed (Miles per hour)

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Curvature, Elevation, and Speed

		Speed (Miles Per Hour)															
		10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	
Degree of Curve	0	15'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	
		30'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	
		45'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1	1 1/2	2	
		00'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1	1 1/2	2	2 1/2	3
	1	15'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1	1 5/8	2 2/8	2 3/4	3 3/8	
		30'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1	1 5/8	2 2/8	2 7/8	3 3/4		
		45'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1	1 5/8	2 2/8	2 7/8	3 5/8			
		00'	1/2	1/2	1/2	1/2	1/2	1/2	1 1/2	2	2 3/4	3 4/8					
	2	15'	1/2	1/2	1/2	1/2	1/2	1/2	1	1 3/4	2 4/8	3 2/8					
		30'	1/2	1/2	1/2	1/2	1/2	1/2	1 1/2	2	3	4					
		45'	1/2	1/2	1/2	1/2	1/2	1	1 5/8	2 3/8	3 3/8						
		00'	1/2	1/2	1/2	1/2	1/2	1	1 7/8	2 3/4	3 3/4						
	3	15'	1/2	1/2	1/2	1/2	1/2	1 1/2	2 1/8	3 1/8							
		30'	1/2	1/2	1/2	1/2	1/2	1 1/2	2 3/8	3 4/8							
		45'	1/2	1/2	1/2	1/2	1	1 3/4	2 6/8	3 7/8							
		00'	1/2	1/2	1/2	1/2	1	1 7/8	3								
	4	15'	1/2	1/2	1/2	1/2	1	2 1/8	3 2/8								
		30'	1/2	1/2	1/2	1/2	1 1/2	2 3/8	3 4/8								
		45'	1/2	1/2	1/2	1/2	1 1/2	2 5/8	3 7/8								
		00'	1/2	1/2	1/2	1/2	1 5/8	2 3/4									
	5	15'	1/2	1/2	1/2	1	1 3/4	3									
		30'	1/2	1/2	1/2	1	2	3 2/8									
		45'	1/2	1/2	1/2	1	2 1/8	3 3/8									
		00'	1/2	1/2	1/2	1	2 2/8	3 5/8									
	6	15'	1/2	1/2	1/2	1	2 3/8	3 7/8									
		30'	1/2	1/2	1/2	1 1/2	2 5/8										
		45'	1/2	1/2	1/2	1 1/2	2 3/4										
		00'	1/2	1/2	1/2	1 5/8	2 7/8										
	7	15'	1/2	1/2	1/2	1 5/8	3 1/8										
		30'	1/2	1/2	1/2	1 3/4	3 1/4										
		45'	1/2	1/2	1/2	1 7/8	3 3/8										
		00'	1/2	1/2	1/2	2	3 4/8										
	8	15'	1/2	1/2	3/4	2 1/8	3 3/4										
		30'	1/2	1/2	7/8	2 1/4	3 7/8										
		45'	1/2	1/2	1	2 3/8											
		00'	1/2	1/2	1	2 1/2											
	9	15'	1/2	1/2	1 1/8	2 2/4											
		30'	1/2	1/2	1 1/8	2 5/8											
		45'	1/2	1/2	1 1/4	2 3/4											
		00'	1/2	1/2	1 1/4	2 7/8											
	10	15'	1/2	1/2	1 3/8	3											
		30'	1/2	1/2	1 1/2	3 1/8											
		45'	1/2	1/2	1 1/2	3 1/4											
		00'	1/2	1/2	1 5/8	3 3/8											
	11	15'	1/2	1/2	1 5/8	3 3/8											
		30'	1/2	1/2	1 3/4	3 1/2											
		45'	1/2	1/2	1 3/4	3 5/8											
		00'	1/2	1/2	2	3 3/4											
12	00'	1/2	1/2	2	3 3/4												
		E = 0.0007 x D x S^2 -1.5 D= Degree of Curve S = Speed in Miles Per Hour E = Elevation in Inches Note: Min E=1/2" Max E=4" For use on all lines except passenger territory															

$E = 0.0007 \times D \times S^2 - 1.5$
 D= Degree of Curve
 S = Speed in Miles Per Hour
 E = Elevation in Inches

Note: Min E=1/2"
 Max E=4"

For use on all lines except passenger territory

Pan Am Railways Manual for Track Maintenance and Construction

Curvature, Elevation, and Speed

			Speed (Miles Per Hour)															
			10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	
Degree of Curve	0	15'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	
		30'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	
		45'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	7/8	
		00'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1	1 1/2	2	
	1	15'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	5/8	1 1/4	1 3/4	2 3/8	3 1/8	
		30'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	5/8	1 1/4	2	2 5/8	3 1/2		
		45'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	5/8	1 1/4	2	2 5/8	3 1/2			
		00'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1	1 3/4	2 1/2	3 1/2					
	2	15'	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1 1/2	2 1/4	3 1/8						
		30'	1/2	1/2	1/2	1/2	1/2	1/2	1	1 7/8	2 3/4	3 7/8						
		45'	1/2	1/2	1/2	1/2	1/2	1/2	5/8	2	2 3/8	3 3/8						
		00'	1/2	1/2	1/2	1/2	1/2	1/2	7/8	1 3/4	2 3/4	3 7/8						
	3	15'	1/2	1/2	1/2	1/2	1/2	1/2	1 1/8	2 1/8	3 1/4							
		30'	1/2	1/2	1/2	1/2	1/2	1/2	1 3/8	2 1/2	3 5/8							
		45'	1/2	1/2	1/2	1/2	1/2	3/4	1 3/4	2 7/8								
		00'	1/2	1/2	1/2	1/2	1/2	1	2	3 1/4								
	4	15'	1/2	1/2	1/2	1/2	1/2	1 1/8	2 1/4	3 4/8								
		30'	1/2	1/2	1/2	1/2	1/2	1 1/2	2 1/2	4								
		45'	1/2	1/2	1/2	1/2	1/2	1 5/8	2 7/8									
		00'	1/2	1/2	1/2	1/2	3/4	1 3/4	3 1/8									
	5	15'	1/2	1/2	1/2	1/2	7/8	2	3 3/8									
		30'	1/2	1/2	1/2	1/2	1	2 1/4	3 3/4									
		45'	1/2	1/2	1/2	1/2	1 1/8	2 4/8	4									
		00'	1/2	1/2	1/2	1/2	1 1/4	2 5/8										
	6	15'	1/2	1/2	1/2	1/2	1 3/8	2 7/8										
		30'	1/2	1/2	1/2	1/2	1 5/8	3 1/8										
		45'	1/2	1/2	1/2	1/2	1 3/4	3 1/4										
		00'	1/2	1/2	1/2	5/8	1 7/8	3 1/2										
	7	15'	1/2	1/2	1/2	5/8	2 1/8	3 3/4										
		30'	1/2	1/2	1/2	3/4	2 1/4	4										
		45'	1/2	1/2	1/2	7/8	2 3/8											
		00'	1/2	1/2	1/2	1	2 1/2											
	8	15'	1/2	1/2	1/2	1 1/8	2 3/4											
		30'	1/2	1/2	1/2	1 1/4	2 7/8											
		45'	1/2	1/2	1/2	1 3/8	3											
		00'	1/2	1/2	1/2	1 1/2	3 1/8											
	9	15'	1/2	1/2	1/2	1 1/2	3 3/8											
		30'	1/2	1/2	1/2	1 5/8	3 1/2											
		45'	1/2	1/2	1/2	1 3/4	3 5/8											
		00'	1/2	1/2	1/2	1 7/8	3 7/8											
	10	15'	1/2	1/2	1/2	2	4											
		30'	1/2	1/2	1/2	2 1/8												
		45'	1/2	1/2	1/2	2 1/4												
		00'	1/2	1/2	5/8	2 3/8												
	11	15'	1/2	1/2	5/8	2 3/8												
		30'	1/2	1/2	3/4	2 4/8												
		45'	1/2	1/2	3/4	2 5/8												
		00'	1/2	1/2	7/8	2 3/4												

E = 0.0007 x D x S^2 -2.5
D= Degree of Curve
S = Speed in Miles Per Hour
E = Elevation in Inches

Note: Min E=1/2"
Max E=4"

$$E = 0.0007 \times D \times S^2 - 2.5$$

D= Degree of Curve

S = Speed in Miles Per Hour

E = Elevation in Inches

Note: Min E=1/2"

Max E=4"

For Use in passenger territory only

SEC. 57.2 ELEVATION

- (a) Figure 574 prescribes the amount of super elevation to be placed and maintained on each curve.
- (b) Curves shall be surfaced to not more than a maximum of four inches (4") elevation and a minimum of 1/2" elevation.

SEC. 59.0 SPIRALS AND ELEVATION RUNOFFS

SEC. 59.1 SPIRALS

- (a) Spirals shall be provided in main tracks at the ends of simple curves and segments between compound curves. Spirals should be provided in other tracks, where practicable to facilitate curve negotiation by long cars.
- (b) A spiral should be used in which the degree of curvature and the amount of elevation at any point should change uniformly with the distance. The rate of change of alignment and elevation must meet the requirements set forth in 49 CFR 213.55 and 49 CFR 213.63.
- (c) The length of spiral should be sufficient to accommodate the entire length of elevation runoff. If physical conditions do not permit a spiral long enough to accommodate the minimum length of runoff, a maximum of one (1) inch elevation may be run off on tangent track.
- (d) The minimum length of spiral for Main Track is determined by the maximum length of spiral produced by the following two formulas:
 - $L = 1.63 \times Eu \times V$
 - $L = 62 \times Ea$ in which
 - L = length of spiral in feet
 - Eu = unbalanced elevation in inches
 - Ea = actual elevation in inches
 - V = maximum train speed in miles per hour

SEC. 59.2 ELEVATION RUNOFFS

- (a) When constructing, reconstructing or changing the alignment of tracks, the change in elevation should be in uniform increments and the rate of change per 31 feet of track should not be more than the following:

Maximum authorized speed	Maximum rate of change
Up to 60 mph.	1/2 inch
61 to 90 mph.	3/8 inch
91 to 100 mph	1/4 inch
- (b) At least 100 feet of tangent track, with zero cross level, should be provided between the zero elevation points in adjacent curves of opposite direction, where practicable.

SEC. 62.0 CLEARANCES AND TRACK CENTERS

SEC. 62.1 TRACK CENTERS

- (a) In maintaining alignment, the existing track centers, including equivalent centers on curves, must not be reduced below the minimum established for the territory.
- (b) For new construction or reconstruction, the following track centers should be used for tangents, and be increased for curves in accordance with paragraph (c), unless otherwise instructed by the Chief Engineer.

Track Centers

Designation of Tracks	On Tangents
1 Adjacent main tracks, including additional main tracks.....	14' - 0"
2 Adjacent yard, industrial and other sidetracks	14' - 0"
3 Main track and any adjacent track, other than another main track or a yard ladder track	17' - 0"
4 Secondary, running, industrial or passing track and any adjacent track, other than a yard ladder track.....	17' - 0"
5 Yard ladder track and adjacent track, except other yard ladder.....	18' - 0"
6 Adjacent yard ladder tracks.....	19' - 0"

- (c) On curves, to provide clearance between cars and locomotives equivalent to that obtained on adjacent tangents, tangent track center distances in paragraph (c) should be increased, as follows:
 - 1 Where the amount of elevation is the same on adjacent tracks or the elevation of the inner track is greater than that of the outer track, increase the tangent track center distance 1 inch for each degree of curvature.
 - 2 Where the elevation of the outer track is greater than that of the inner track, the tangent track centers distance should be increased 1 inch for each degree of curvature, plus 3 ½ inches for each 1 inch of difference of elevation of the two tracks considered.

- (d) Track centers required to provide a minimum clearance of 6 inches between any combination of diesel and/or electric locomotives, passenger cars and AAR Plate "C" cars are shown in the following table:
- 1 Where the outer track has less elevation than the inner track on a curve, the track centers shall be as required by the table for the curvature and elevation of the outer track.
 - 2 Where the outer track has more elevation than the inner track, the track center distance shall be as required by the table, plus 3 ½ inches for each 1 inch of difference in elevation for the two tracks considered.

SEC. 62.2

INTER-TRACK CLEARANCE LIMITING OBJECTS

- (a) For the following signals placed between the tracks, track center distances shall not be less than 25 feet:
1. One arm position light signals, where the center of the background is less than 18 feet above top of rail.
 2. Two arm position light signals, where bottom arm other than a marker or vertical aspect is used, and the center of the bottom arm aspect is less than 18 feet above top of rail.
 3. Search light or color light signals, where the overall width of the signal is in excess of 24 inches at any point less than 18 feet above top of rail.
- (b) For signals, other than those described in paragraph (a), the track center distance shall not be less than 19 feet.
- (c) For Signal Bridge supports, pedestal signals or switch stands with intermediate or high staff, the track center distance shall not be less than 19 feet.

SEC. 62.3 OTHER CLEARANCE LIMITING OBJECTS

For clearance limiting objects other than those described in Sec. 62.2, check with the Railroad Clearance Engineer.

SEC. 63.0 GRADES

SEC. 63.1 LIMITATIONS

No grades shall be introduced exceeding a rate of 2½ % unless authority has been obtained from the Principal Engineer.

SEC. 63.3 VERTICAL CURVES

- (a) Where changes in grade occur, gradient lines should be connected by vertical curves, observing the following provisions:
 - 1. The length of a vertical curve is determined by the difference in grades to be connected and the rate of change adopted.
 - 2. For high-speed main tracks the rate of change should not be more than 0.05 foot per station of 100 feet in sags, and not more than 0.10 foot per station of 100 feet on summits.
 - 3. For other main line and secondary tracks the rates of change may be twice those for high-speed tracks.
 - 4. For tracks of lesser importance the rates of change may be relatively large but not greater than practical conditions permit.
- (b) On curves the low rail will be kept on established grade.
- (c) Minimum radii, which may be used on vertical curves of hump tracks in gravity yards, are:
 - 1. 1,200 feet where locomotives are operated over the hump.
 - 2. 400 feet where cars only are operated over the hump.

(The last figure also applies to vertical radius at the top of inclines leading to car dumpers.)

SEC. 64.0 TRACK SURFACE

SEC. 64.1 GENERAL

- (a) Track surface is the relationship of opposite rails to each other in profile and cross-level. Track profile is the running surface along the top of the grade rail. Cross-level is the difference in elevation of the tops of heads of opposite rails measured at right angles to the track alignment. The ideal surface is a uniform profile consisting of straight gradients connected by vertical curves, with zero cross level on tangents and predetermined cross-level on curves.
- (b) When constructing, reconstructing, or changing the alignment of tracks, rates of change in cross-level shown in Sec. 59.2 should be used as a maximum.
- (c) The profile of track being surfaced should not be raised above established grades, except under instructions from the Principal Engineer, who will give consideration to the required elevations and clearances in tunnels, under catenary systems and overhead structures, and at interlocking plants, under-grade bridges, platforms and highway grade crossings.
- (d) Any encroachment upon the published minimum overhead or side clearances from a track that will adversely affect the movement of oversize shipments, will not be permitted.

SEC. 64.2**MAINTENANCE**

- (a) The following criteria will serve as a practical guide for maintaining smooth riding conditions in existing tracks:

Speeds in Miles per Hour

Description	From 5 to 15 mph	16 mph to 50 mph	51 mph to 70 mph	71 mph to 100 mph	Greater than 100 mph
The run-off per 31 feet at the end of a raise, MAX	2"	1 and 1/2"	3/4"	1/2"	3/8"
The change in cross level on spirals of curves in 31 feet. MAX	1 and 1/2"	1"	3/4"	1/2"	3/8"
The change in cross level between any two points less than 62 feet apart on curves between spiral and tangents, MAX	1 and 1/2"	1"	3/4"	1/2"	3/8"
Variations in elevation on curves, spirals or on tangents from that designated, max.	_____	3/4"	1/2"	1/2"	3/8"

- (b) Track surface must be corrected prior to reaching the limits prescribed in the FRA Track Safety Standards 49 CFR Part 213.63.
- (c) The basic tool for determining correct track surface is the standard track level, which should be checked by the Track Supervisor periodically and by the Track Foreman or the employee inspecting track, each day it is used. If found to be incorrect, it must be accurately adjusted or replaced. Other approved devices may be used for determining cross-level, but their accuracy should be determined by comparison with a standard track level in correct adjustment.
- (d) When surfacing or raising track, one rail that is designated to be the lower rail on curves, and commonly the line rail on tangents shall be selected as the grade rail. The other rail must be brought to surface by adjusting the cross-level as needed.

SEC. 64.3 SPECIAL ATTENTION

- (a) Special attention must be given to the surface and line of track at the ends and approaches of bridges, crossings and platforms.
- (b) When placing or tamping ties, particularly in interlocking plants, care must be taken to avoid breaking or damaging bond wires, pipes, cables or wires connections to the tracks.
- (c) In overhead-electrified territory, care must be exercised to avoid reducing clearance between the top of rail and contact wire at established low points, or to establish new low points. Advance notice must be given to Foreman-electric Traction when it is necessary to raise tracks under overhead structures or low spots under the catenary system.
- (d) In very hot weather, special attention must be given to longitudinal movement of rail, frozen joints, skeletonized track, and on track located at the foot of heavy grades or in sags, to avoid displacement of track or "sun-kink". Joint condition must be checked before installing ties or surfacing, and frozen joints loosened to allow the rail to move. (Refer to SEC. 119.0).
- (e) During freezing and thawing weather, attention must be given to the surface of track likely to be affected by heaving due to frost action. Surface irregularities due to frost action that cannot be corrected by usual procedures may be temporarily corrected by use of track shims.

SEC. 64.4 RAISING TRACK

- (a) When track is surfaced out of face, both rails should be raised together. When track jacks are used, they should be placed opposite each other, and must not be placed within the gage of the track except when absolutely necessary, and then only under proper protection.
- (b) On tracks of assigned direction, track raising should be performed against the current of traffic except on grades of more than one (1%) percent, where it may be desirable to work up grade.
- (c) Before raising track in hot weather, there must be assurance that the track will not warp or buckle. Bolts should be loosened and subsequently retighten where necessary. (Refer to SEC. 119.0 for work in CWR Territory).
- (d) Adequate ballast required to maintain the track's cross-section should be distributed in advance of the raising.
- (e) Track, which has been surfaced will be inspected by the Foreman in charge prior to returning the track to service. The first train over the new work shall be restricted to a maximum speed of 25 m.p.h.
- (f) Track should not be raised in interlocking or automatic signal territory until advance notice has been given to the Signal Maintainer or Inspector, so they may adjust any switches that may be involved.

**SEC. 70.0 SECONDARY, YARD AND INDUSTRIAL
TRACKS & SIDINGS**

SEC. 70.1 GENERAL

- (a) Due to the increasing weight and size of locomotives and freight cars, the proper design must be considered in the construction of tracks. The prerequisite in design for the rolling stock to accurately negotiate curves, reverse curves, crossovers, ladder tracks and sidetracks must be met, so that the track will not lose its utility for the intended use.
- (b) New sidetrack designs, including alignment, grade and clearances, when in accordance with these provisions, shall be approved by the Principal Engineer.
- (c) Unconnected ends of secondary and yard tracks must be curved away from adjacent main tracks.
- (d) Where there is danger of injuring persons or property, if cars should be run off the end of the track, a bumping post or wheel stop, of approved type may be provided. Wheel stops shall not be used on tracks used by passenger equipment.

SEC. 70.2 TURNOUTS

- (a) No. 10 or No. 15 turnout should be used where heavy drawbar forces may be anticipated in order to reduce the lateral forces produced by long cars.
- (b) No. 8 turnout should be used only where cars are moved in light drafts and where physical constraints prohibit the use of No. 10 turnout or greater.
- (c) Turnouts having curvature greater than No. 10 shall not be used without the approval of the Principal Engineer.

SEC. 70.3 CURVATURE

- (a) No curves shall be constructed or realigned resulting in a curvature greater than that adopted for permanent use in the district where located. Every opportunity should be taken to lessen the curvature in existing track.
- (b) In the construction of new yards and sidetracks, the minimum radius of curvature shall be 716.8 feet (maximum curvature 8 degree) except with special approval of the Principal Engineer.

SEC. 70.4 SPIRALS

- (a) Wherever practicable, a special easement of not less than 62 feet should be provided on all yard and sidetrack curves.
- (b) Between reverse curves, where spiral easements have not been provided, and between opposing adjacent turnouts of the same hand, there should be a length of tangent equivalent to the longest car or unit operated over the track, but not less than 40 feet.

SEC. 101.0 MATERIAL

SEC. 101.1 GENERAL

Included in "track structure" are: Sub-ballast, ballast, ties, rails, rail fastenings, turnouts, track crossings, and other associated materials.

SEC. 101.2 HANDLING AND CARE

- (a) The transfer of materials from place to place, and caring for materials on hand is costly. For these reasons, the amount of material on hand and the number of times material is handled should be kept to a minimum. With the exception of emergency and non-programmed maintenance work, prudent planning of projects and work in close cooperation with the Material Management Group will minimize the cost associated with the handling and care of materials.
- (b) Threaded and/or insulated materials and parts should be protected from the weather. If exposure to the weather is unavoidable, threaded materials should be coated with protective oil.

SEC. 101.3 CLASSIFICATION

Materials are considered to be in one of the following conditions:

- (a) **New** - Unused, as manufactured or modified.
- (b) **Rehabilitated** Materials removed from track upon which work has been performed since removal, as:
 - 1. Reformed joint bars and rail anchors.
 - 2. Rebuilt frogs, switches and crossings.
 - 3. Recut switch points.
 - 4. Repunched tie plates.
- (c) **Fit** (relay) usable (secondhand), as removed from track with no work performed upon it, as Fit rail (relayed rail).
- (d) **Scrap**.

SEC. 103.0 BALLAST

SEC. 103.1 GENERAL

- (a) Ballast shall conform to GTI Standard Specifications and may be obtained only from approved quarries.
- (b) Crushed stone shall be used for ballast, except that ballast other than stone ballast may be used at locations specifically approved by the Principal Engineer.
- (c) The class and size of ballast to be used for the various lines and tracks shall be AREMA size #4.
- (d) When ballast received is of inferior quality, has improper grading, or contains excessive quantities of screening, dirt and/or foreign matter, a report shall be made to the Principal Engineer, so that corrective action may be taken.
- (e) If ballast is shipped under a weight agreement, the Principal Engineer should arrange for periodic checks of weight to protect against potential shortages or overloading of ballast cars.

SEC. 103.2 DISTRIBUTION

- (a) To the extent practicable, ballast should be unloaded in position for use with a minimum of redistribution and dressing, using special ballast cars when available.
- (b) Ballast must be distributed or immediately dressed so that ample clearance is provided for rolling stock and equipment, and to insure that switches are not fouled and guardrails are unobstructed.

SEC. 103.3 CROSS SECTION

- (a) Ballast and sub-ballast cross sections should conform to Standard Plans.
- (b) A speed restriction must be placed where there is insufficient ballast to provide a stable track.

SEC. 103.4 BALLAST CLEANING

When ballast in track becomes fouled, it should be mechanically cleaned or scarified to restore proper drainage.

SEC. 103.5 SIZE AND GRADATION

The nominal size of crushed stone used for ballast shall be as follows, unless otherwise authorized by the Principal Engineer. Ballast size:

AREMA Number 4. 1 ½" to ¾"

SEC. 107.0 CROSSTIES WOOD

SEC. 107.1 SIZE

The sizes of crossties shall be in accordance with GTI Specifications for crossties and designated as Numbers 1, 2, 3 (6 inch) and 3A, 4, 5 (7 inch).

SEC. 107.2 USE

- (a) 7inch ties shall be used in tracks with traffic of 5 million gross tons or greater. 6-inch ties are suitable for tracks with less than 5 million gross tons of traffic per year.
- (b) The Principal Engineer shall determine the size of crossties to be used in specific situations requiring interpretation of these specifications.
- (c) The spacing of ties, which shall be considered as the standard tie spacing for each line and class of track shall be designated by the Principal Engineer in accordance with the service requirements and based on the following spacing from center of tie to center of adjacent ties.

Main Tracks	20 inches
Secondary Tracks	22 Inches
Yard and Sidetracks	24 inches
All tracks – Concrete ties	24 inches

SEC. 107.3 INSTALLATION

- (a) Ties should be placed in track square to the line of the rail.
- (b) The ends of standard 8 ft.6 in. ties should be brought to a uniform line 18 ½ inches from the edge of the base of rail
- (c) Ties shall be kept sufficiently spaced and square to the line of rail to permit proper tamping. When necessary, ties should be respaced as track is rehabilitated by gangs equipped with suitable machinery.

SEC. 107.4 DAMAGE TO TIES

- (a) When handling or spacing ties, care shall be taken not to damage ties with picks or spiking hammers. Tie tongs, lining bars, other suitable tools or tie spacing equipment shall be used.
- (b) Only sufficient adzing to obtain a sound and true bearing for the tie plate shall be done.
- (c) Standard tie plugs must be used to plug holes when spikes have been drawn. Alternative plugging material may be used with the approval of the Principal Engineer.

SEC. 108.0 SWITCHTIES

For the required size, length and quantity of switch ties, see the appropriate standard plans.

SEC. 109.0 BRIDGE TIES

- (a) Bridge ties shall be adzed, framed and sized according to framing plans prior to treatment. Suitable holes must be bored for drive spikes, which fasten tie spacing bars or timbers.

SEC. 113.0 RAIL

SEC. 113.1 GENERAL

- (a) As used in these instructions jointed rails are conventional rails bolted together. CWR is defined as rails fabricated into strings longer than 400' by butt welding and designated by the initials "CWR".

SEC. 113.2 CLASSIFICATION AND IDENTIFICATION

(a) **By Mill Inspection - New Rails**

Rails are classified and identified in accordance with A.R.E.M.A. "Specifications for Steel Rails Chapter 42," as follows:

High strength rails shall be marked by either a metal plate permanently attached to the neutral axis, hot stamped, or in the brand, which gives the manufacturer, type and/or method of treatment. Heat-treated rail shall be paint-marked orange and alloy rail shall be paint-marked yellow.

* "A" rails shall be painted yellow.

* Rails except for those 80' or 39' shall be paint marked green.

Individual rails shall be paint marked only one color according to the order listed above, or as agreed upon by purchaser and manufacturer.

Paint markings must appear on the top of the head at one end only, at least 3' from the end.

All short length rails produced shall have the length identified on the top of the head approximately 1' from the end in a manner acceptable to the Principal Engineering Officer of the Railroad and the Manufacturer.

(b) **By Service Developments FAILED RAILS.**

- (1) Rails removed from track on account of any defects, except end defects of the type described in paragraph (2) below must have the top of the rail head noticeably damaged, using a cutting torch, or power saw, so that they will not be mistakenly returned to service in track. Such failed rails, damaged as above, are to be classified as scrap.
- (2) Rails removed from track on account of end defects, such as a bolt hole crack or head and web separation where a portion of the rail end is not physically broken out, must have the top of the rail noticeably damaged at the location of the defect, using a torch or power saw to insure that a rail of this type is not returned to service without cropping off the defective end.

SEC. 113.3 SERVICE ASSIGNMENTS

<u>CLASS OF RAIL</u>	<u>Use</u>
No. 1 Rail	In main track without restriction
Fully Heat Treated Rail	For stock rails or lead rails or lead rails of turnouts and manufacture of frogs, switches and special track work.
No. 1 Rail:	Prime rail that conforms to the latest A.R.E.M.A. Specifications.
Fully Heat-treated Rail:	Prime rail that is fully quenched and tempered to increase hardness and strength.

(b) Cropped or fit rail

- (1) Rails in main track may be relayed or fabricated into CWR strings without restriction.
- (2) Rails removed from track having only end defects, such as bolt-hole cracks or head-web separations within joint bar areas, maybe used without restriction after defects have been eliminated by cropping.
- (3) Fit rail for relaying should be graded and marked at cropping plant according to its physical condition and classified for reuse in accordance with SEC.113.5.

SEC.113.4 DISPOSITION AND SHIPMENT

- (a) Rails released from renewals and retirements must be shipped to the cropping plant, unless other disposition is authorized by the Principal Engineering Officer.
- (b) All rail anchors must be removed from rails before loading rails into cars.

SEC. 113.5**GRADING AND MARKING RAIL FOR REUSE**

- (a) The suitability of rail for reuse will be determined in accordance with the applicable A.R.E.M.A. Table (4.26.6) which reads as follows:

Recommended Rail Grading Classifications**Maximum Rail Wear-Inches**

Wght.	Top	Gage	Gen. Rail Use & Rail Conditions
Class I			
140	1/4	1/2	Main Line - Very minor engine burns and corrugation.
132-131	3/16	1/2	
122	5/32	7/16	
115	1/8	3/8	
112	1/8	1/4	
100	1/8	1/8	
90 and lighter	1/8	1/8	
Class II			
140	3/8	3/4	Branch Line - Small engine burns and corrugation.
132-131	5/16	3/4	
122	5/16	3/4	
115	5/16	3/4	
112	5/16	1/2	
100	3/16	1/4	
90 and lighter	1/4	3/16	
Class III			
140	5/8	7/8	Light Branch Line- Medium engine burns and corrugation, may be pitted and show some oxidation.
132-131	7/16	7/8	
122	1/2	7/8	
115	3/8	3/4	
112	3/8	3/4	
100	1/4	1/4	
90 and lighter	5/16	5/16	

Class IV

140	3/4	1	Yards - Any burns not mashed or fractured.
132-131	9/16	1	
122	11/16	1	
115	1/2	7/8	
112	1/2	7/8	
100	7/16	7/8	
90 and lighter	3/8	3/8	

- (b) When rails are graded, they will be marked with stripes across the head of rail, at one location 4' from the end of rail, or they may be marked with dots in the web section of rail at one location 4' from the end of rail. Consistent with SEC.113.5 (A), the rails will be marked as follows:

Class I	1 stripe	1 dot
Class II	2 stripes	2 dots
Class III	3 stripes	3 dots
Class IV	4 stripes	4 dots

- (c) No rail shall be less than 30' after cropping.

SEC. 113.6 TRANSPOSING RAIL ON CURVES

- (a) To obtain the maximum service life of rails on curves, the high and low sides should be transposed before horizontal wear, vertical or flow of metal in the head makes this impracticable because of undesirable rail head stresses.
- (b) In general, high and low sides should be transposed when the horizontal wear on the high rail is at the gage wear limits for Class I rail as prescribed in Sec. 113.5(B).

SEC. 113.7 DISTRIBUTION

- (a) Rails should be unloaded in position for laying to minimize further handling.
- (b) Rails should be placed parallel with the track and base down, avoiding excessive bending or damage. Care should be taken to avoid placing rails on manhole covers or close to signal facilities.
- (c) CWR ends must be offset to allow for thermal expansion.
- (d) In yards and at locations where employees must walk close to the track, rails should be placed as near to the ends of ties as possible to avoid obstructing the walkway area.

SEC. 113.8 PREPARATION AND CARE

- (a) Track should be placed in good line and surface prior to rail renewals. Track to be laid with CWR must have standard ballast section for welded rail. Programmed tie renewals should be reviewed by Principal Engineering Officer prior to schedule rail installation.
- (b) Rails should be examined for defects and damage prior to laying in track.
- (c) At the time of installation care should be taken so that no damage to rail or fastenings will result. Loose ties should be tamped to a full bearing under the rail immediately behind the rail laying operation.

SEC. 113.9 LAYING JOINTED RAIL

- (a) Jointed rails should be laid, one at a time, with space allowance for expansion being provided between rail ends in accordance with the following table:

39' RAILS

Rail temperature

(Deg.F.)	Rail end space
Below 6 Deg.	5/16"
35 to 47 Deg.	1/4"
47 to 60 Deg.	3/16"
61 to 73 Deg.	1/8"
74 to 85 Deg.	1/16"
Over 85 Deg.	None

- (b) To insure the space allowance required, rail ends should be brought squarely together against approved expansion shims of proper thickness and the rail joints bolted before spiking.
- (c) Space between rail ends in insulating joints should only be sufficient to permit insertion of standard end posts.
- (d) A standard rail thermometer shall be used in accordance with SEC.119.4(a). A qualified Track Inspector/Maintainer shall see that the rail temperature is checked frequently and that proper rail expansion shims used.

- (e) Rails should be laid so that the joints of one line of rails shall be opposite the quarter point of rails in the other line with permissible variations as follows:
 - (1) Through turnouts and at insulated joints.
 - (2) Rails laid with the joints of one line of rail opposite the middle of rails in the other line in accordance with former standards, need not be relocated until out-of-face rail renewals are made.
 - (3) When approved by the Principle Engineering Officer, and when protected by a speed restriction which is less than the authorized speed identified in 49 CFR 213.9 for FRA Class III track. Tangent track, when constructed by the panel method, in other than main track, rail joints may be left opposite one another for a short period of time.
- (f) Rails less than 14' in length should not be used in main track, except that rails less than 14' may be used for:
 - (1) Connections within turnouts and crossover.
 - (2) Temporary closures.
 - (3) Temporary replacement of broken rails to allow for the safe passage of trains.
- (g) When laying rail, avoid placing bolted joints in or closer than 50' to the edge of road crossings, or closer than 12' within the limits of switch rails, guard rails, ends of open floor bridges, concrete deck track, trestles or viaducts without approval of Principle Engineering Officer.
- (h) Rails of the same section should be used on open floor structures, through road crossings and paved track areas of station platforms, and to the greatest extent possible in turnouts and crossovers.
- (i) Rails of unequal wear and different sections must be brought to an even surface at joints. If the difference in height of rails must be run off by the use of shims, wood or metal shims of proper thickness, with holes provided for spikes and of ample size to permit secure fastening to the ties, that must be placed between the tie plates and ties. When shimming is performed, the requirements of SEC. 213.109 must be met.

SEC. 113.10 BOLT HOLES

Holes must be provided in accordance with standard plans and the following practices:

- (a) When holes are necessary, they must be drilled. All bolts must be of proper dimension, and installed in accordance with the applicable standard plan for the specific rail section, by placing drill bit directly against the web of the rail, or by drilling through an approved template.
- (b) When bolt-holes are drilled, a uniform feeding pressure should be maintained and then reduced as the bit point breaks through the opposite side of the web. Forcing the drill may produce a ragged hole, with possibility of a resultant bolt hole cracks. Lubrication should be used throughout this operation.
- (c) When it is necessary to use a cut rail at a compromise or insulated joint location, the milled or shop drilled end of the rail should be placed in the compromise or insulated joint. The bolt holes must be accurately drilled in accordance with the provisions of paragraph (a).
- (d) When connecting CWR or cutting in a replacement rail, the first hole at the end shall be blank for field welding unless approved by the Principal Engineering Officer.
- (e) In an emergency, it is acceptable to create a bolt hole using a torch. Provided however, that the hole diameter is larger than the diameter of the bolt to be used. The joint bars must be removed prior to the start of this procedure and the hole must be inspected to assure that any buildup of slag, burrs or chipped edges which may contact the bolt, once it is installed, are removed. In main track, the speed of trains must be reduced to a speed less than that authorized in FRA Class II, this rail must be replaced as soon as possible with a properly drilled rail. In yard and secondary tracks where the operating speed of trains is less than FRA Class II, the rail may remain in track.

SEC. 113.11 CUTTING RAIL

- (a) The tools, which may be used for cutting rails, are listed below;
 - (1) Power saws (Abrasive or Reciprocating)
 - (2) Track chisels.
 - (3) Gas cutting torches may be used in accordance with good engineering practice. On yard tracks, secondary main tracks and on industrial sidings. A gas cutting torch may be used on main track in an emergency with an appropriate speed restriction (less than FRA Class II). However, rails so cut must be replaced prior to track being placed in normal service. compliance with FRA 213.122. is required.
- (b) When using a track chisel, a sledge must be used. The use of a spiking hammer is prohibited.
- (c) Gas or electric arc welders are prohibited on any portion of the rail except as listed below;
 - (1) Welding of engine burns in accordance with good Engineering Practices.
 - (2) Application of welded bonds.
 - (3) Top of rail within limits, of joint bars.
- (d) Any rail accidentally damaged by torches must be promptly removed from track.

SEC.119.0 CONTINUOUS WELDED RAIL (CWR)

SEC.119.1 USE

- (a) CWR fabricated by an approved process may be laid without restriction in fully ballasted tracks on tangents and on curve up to 10 degrees.
- (b) CWR may be laid across open deck bridges where bridge ties are spaced with timber blocks between ties, provided that the following conditions are satisfied:
 - 1. All ties and blocks in a panel are tightly jacked and fastened together with guard timbers or spacing bars secured by lag screws in every third tie.
 - 2. Bridge ties are securely fastened to steel structure by means of hook bolts, tie anchors or other holding devices in a manner approved by the System Engineer Structures Maintenance.
 - 3. The bridge structure is properly anchored to abutments and piers to prevent any movement other than normal expansion.
 - 4. CWR is anchored to the bridge ties in both directions in accordance with Sec. 213.125.
- (c) Where bridge ties are not spaced with timber blocks between ties, CWR may be laid across open deck bridges under the following conditions:
 - 1. Across bridges up to and including 100 feet in length on tangents, provided every third bridge tie is fastened to the steel structure by means of approved tie anchors and the CWR is anchored on every tie in both directions for at least 200 feet on each approach to the bridge in accordance with Sec. 213.125. Rail anchors should not be used on ties across the bridge.
 - 2. On bridges more than 100 feet in length and up to and including 300 feet in length, as required by paragraph (1) above, except that every other bridge tie should be fastened to steel structure.
 - 3. Bolted rails not longer than 78 feet should be laid across open deck bridges on curves and on open deck bridges longer than 300 feet on tangents.

SEC. 119.2 CONNECTING CWR

- (a) CWR strings may be field butt welded by an approved process into long lengths in all classes of track. Where necessary to use a short rail to connect CWR strings, that rail should be at least 14 feet long.
- (b) If it becomes necessary to apply joint bars temporarily, the end bolt hole in each rail must not be drilled to permit subsequent prompt field welding. It may be necessary to additional rail anchors to prevent pull-aparts prior to field weld being made.
- (c) Except where field butt welded, CWR strings are to be fastened to each other or to buffer rails with fully bolted rail joints, except as provided in paragraph (b) above.

SEC. 119.3 RAIL ANCHORING

Each CWR string is to be anchored in accordance with SEC. 125.1

SEC. 119.4 RAIL TEMPERATURE

- (a) A standard rail thermometer shall be used to measure the rail temperature of all CWR before it is installed in track. The thermometer should be laid on the base of the rail close to the web, shielded from the direct rays of the sun, and left there long enough to determine the temperature accurately. All thermometers must be checked for accuracy.
- (b) CWR must be adjusted at rail temperatures above 90 deg. Fahrenheit.
- (c) When the rail temperature is lower than 90 deg. Fahrenheit, an approved rail expanding method must be used for adjusting the CWR.
- (d) Where CWR has been anchored at a rail temperature below 90 deg. Fahrenheit it should be adjusted as soon as conditions permit the rail to be properly anchored.
- (e) The supervisor installing CWR shall be responsible for recording the rail temperatures at which each CWR string is anchored, for all CWR installed or adjusted. He shall forward this information to the appropriate Principal Engineering Officer, Engineer of Track, Local Track Supervisor, and retain a copy for his records.

SEC. 119.5 ADJUSTMENT OF CWR

- (a) To adjust existing CWR when anchoring temperature was below 90 deg., its length must be decreased by cutting the rail at least the distance in accordance with paragraph "B" and then properly adjusted by expanding.
- (b) The number of inches by which a segment of CWR should be adjusted for a temperature above 90 deg. may be calculated by taking the difference between the actual rail temperature, at time of adjustment and desired rail temperature, multiplying that difference in degrees Fahrenheit by the length of the CWR in feet, and multiplying the product by 0.000078. For example, to adjust a 1080' length of CWR, anchored at a rail temperature of 45 degrees to correspond to the length of this rail at 90 degrees; obtain a difference of 45 degrees by subtracting the temperature that the rail was laid at (45 degrees) from the desired temperature of 90 degrees and then multiplying as follows:

$$(T_d - T_a) \times L \times E = A$$
$$(90 - 45) \times 1080 \times 0.000078 = + 3.8 \text{ inches}$$

T_d = desired rail temperature
T_a = actual temperature rail was laid
L = length of rail
E = 0.000078 coefficient of expansion for rail steel
A = adjustments (inches)

SEC. 119. 6 ADJUSTMENT BY HEATING, NATURAL TEMPERATURE CHANGES OR MECHANICAL EXPANSION

- (a) Rail may be expanded in the tie plates before or after spiking, but must be adjusted before it is anchored. All rail anchors, clips, and insulators must be removed from strings of CWR requiring adjustment to permit the desired expansion or contraction.
- (b) The number of inches each CWR string should be adjusted during the rail installation or adjusting operation may be determined by calculation according to SEC.119.5 (b).

- (c) Prior to removing anchors or clips, space equal to the amount of expansion needed for each string of CWR should be provided between the end of the string and the near end of the of the next adjacent string. A minimum of 10 ties should be boxed anchored on the near end of the adjacent string to hold it in place and avoid closing the expansion gap of the string being heated. Two fully clipped ties will be considered the same as a box anchored tie.
- (d) Uniformity of expansion is to be controlled by marking each quarter of the string and introducing expansion as follows:
 - 1/4 point 1/4 of total required expansion
 - 1/2 point 1/2 of total required expansion
 - 3/4 point 3/4 of total required expansion

Note: Quarter points should be marked with a continuous line from the base of the rail to the tie plate, or shoulder of a concrete tie so the amount of expansion can accurately be determined. The reference point must be one that will not move as rail expands.
- (e) CWR should be heated so that expansion is introduced from one end of each string to the other. Heat should be steadily applied while moving forward until the required expansion has been obtained at the end of the string. IN the event any quarter point does not have the required expansion the heater will back over that portion (without applying heat) and then reheat the rail until the necessary expansion is obtained.
- (f) Tie plates, on wood cross tie track, should be tapped with hammer or approved mechanical device used to free the rail.
- (g) As adjusting is progressed, a minimum of 4 ties should be boxed anchored or fully clipped per 39' of rail to prevent the rail from losing adjustment.
- (h) At the end of the completely expanded string, a minimum of 20 ties should be boxed anchored or fully clipped immediately after the gap is closed, to hold the expansion.
- (i) The minimum length of CWR to be adjusted will be in accordance with sound Engineering Practices.
- (j) CWR is to be anchored in accordance with SEC.125.1

SEC. 119.7 MAINTAINING CWR

- (a) The following classification of maintenance operations do not constitute disturbing the track structure:
1. **Cleaning ballast** in the shoulder section or six-foot section of the track structure provided ballast is restored immediately behind the ballast cleaning operations.
 2. **Spot tie replacement** (4 ties or less per 39' segment of track) where there are 4 adjacent ties, on each side of the tie, which is to be replaced. These ties must be properly spiked and tamped and rail anchors in position. The new ties must be tamped and the ballast section properly restored.
 3. **Surfacing operations and lining operations** where not more than 6 consecutive ties are lifted from their tie beds, and not more than 6 ties are lifted in any 39' segment of track.

Note: When activities described in Paragraph (a)(2) or (a)(3) are undertaken when the rail temperature is 110 degrees Fahrenheit or greater, they should be considered activities which disturb the track structure and appropriate precautions should be taken.

- (b) Any activity, which may cause a downward shift in the neutral temperature of CWR. Must be protected by a speed restriction of not more than 25 MPH and the affected Supervisor or Foreman must also complete a Record of Track Disturbance Report. This downward shift in the neutral temperature can occur when any of the following operations are conducted:

1. When curves are realigned out-of-face inward in excess of one inch (1") the curve will be considered to have lost its temperature adjustment.

Note: Out-of-face curve realignment is defined as shifting a curve consistently in one direction at all throw points. The normal balancing of throws done during surfacing operations does not constitute out-of-face curve realignment.

Cold weather surfacing operations (rail temperature of 50 degrees Fahrenheit or less) might increase the probability, on curved track, of an unintentional inward shift in alignment. To monitor CWR, on curved track, as a result of disturbed track against such unintentional inward shifts of alignment, the existing track alignment must first be established throughout the curve. One degree or more of curvature in the track structure will require **offset staking of curves**. Measurements should be verified by offset staking prior to starting cold weather surfacing operations. Maximum distance between reference stakes (or other permanent reference points) may not be greater than 250 feet. These measurements must be checked immediately upon completion of the surfacing operation. The affected supervisor or foreman will recheck these measurements approximately one week following the surfacing operations. If upon inspection an inward shift of alignment of one inch or more is discovered, follow the procedures detailed above in section (b). Prior to the onset of hot weather, the curve should be realigned to its original position or the rail in the curve adjusted. If neither is done prior to hot weather, a protective slow order must be placed until it can be accomplished. The Engineer of Track and the Supervisor of Track are responsible for reviewing track disturbance reports and taking the appropriate action when required.

2. When rail is replaced and more rail is added than was removed, the location must be adjusted prior to hot weather, or a protective slow order must be placed until the location can be adjusted. Also, a **Record of Track Disturbance Report** must be made out by the Foreman and this report must be forwarded to the Track Supervisor and the Engineer of Track.

The Engineer of Track confirms that anti-track buckling patrols are established when the ambient temperature becomes 90 degrees or greater. The Engineer of Track must incorporate the **Record of Track Disturbance Report** as the keystone for track inspections, executed in relation to anti-track buckling patrols. The Engineer of Track will assure that anti-track buckling patrols are performed when there is a temperature changes in conjunction to the information contained in the track disturbance report, The Engineer of Track will concentrate on such details which may have adversely affected the rails neutral temperature. This anti-track buckling inspection procedure will continue until the affected segment of track is brought into compliance with this policy.

(c) A protective slow order not to exceed 10 MPH (without mechanical stabilization) for the first train, will be applied when the following types of operations occur which may disturb the roadbed or ballast section.

- 1 Track undercutting
- 2 Out-of-face crosstie replacement
- 3 Out-of-face track surfacing
- 4 Removal of shoulder ballast
- 5 Track panel or Turnout panel installations

After the passage of the first train a 25 MPH protective slow order will be established until at least 6 tonnage trains have passed over the affected track. The use of mechanical stabilization will reduce this directive to 3 tonnage trains.
Note: For the interpretation of the above paragraph, the passage of two passenger trains will be the equivalent of one tonnage train.

After the passage of the required trains, the involved Supervisor or Foreman will make an inspection over the altered track segment to ascertain that the track has stabilized, prior to the removal of the protective slow order.

**SEC. 119. 8 REPLACEMENT OF DEFECTIVE RAIL OR WELDS, OR
INSTALLING TRACK PANELS AND TURNOUT PANELS**

- (a) Defective rails and welds should be cut out using an approved tool and replacement rail field welded in. The entire rail must be removed where longitudinal defects or where transverse defects in non-control cooled rail are involved.
- (b) In order to prevent adding rail when field welding, changing a defective rail installing a plug, Track Panel or Turnout Panel, the following procedure must be used when the rail temperature is less than or more than the rail installation temperature.
 - (1) When field welding, the required gap must always be obtained by cropping the ends of rail, with a rail stretcher used to hold the rail when necessary.
 - (2) When changing a defective rail installing a Plug, Track Panel or a Turnout Panel, the length of rail to be replaced must be measured prior to removal and the piece to be installed cut to the same length.

**SEC. 119.9 PROCEDURES FOR MAKING REPAIRS TO BUCKLED
TRACK**

- (a) Line the track sufficiently to insure that all pressure has been removed, in order to prevent the possibility of the track reacting rapidly when it is cut, cut both rails with a torch at the location of maximum displacement. If the displaced area is near a joint, then the joint bars should be removed.
- (b) Align the cut or the uncoupled rails, allowing the ends to bypass.
- (c) In order to insure that the expansion is made uniformly throughout the rail being adjusted, mark the rails at 75', 150', and 225' from the location where the rails are bypassed.
- (d) Remove all the anchors for 300' each side of the location where the rails have been bypassed, in order to properly adjust the rails.
- (e) If the rail temperature is above 90 deg. the adjusting of the rail can be completed. The expansion should be uniformly distributed throughout the 300' of rail, which can be determined by noting the amount of rail movement at the previously marked locations at 75', 150' and 225' from the bypassed end. Particular attention must be paid to insure that the rail does not bind on the tie plates, spikes or other obstructions. the tie plates should be tapped, as necessary, to obtain free rail movement.

- (f) After determining that the proper expansion has been attained throughout the 300' of rail, the rail anchors can be reapplied. Start applying the anchors at the point 300' from the location where the rails are bypassed and work towards that area. At each of the points marked on the rail, be certain that the expansion is being made uniformly throughout the rail. All rail anchors must be reapplied properly and installed tightly against the ties.
- (g) If the temperature is under 90 deg. the rail must be heated to obtain proper adjustment. The procedures to be followed are the same as outlined for adjusting the rail when the temperature is above 90 deg. Fahrenheit. The rail must be heated from the point 300' from the location where the rails are bypassed and the rail anchors reapplied to hold the expansion as the heater moves toward the rail bypass point. Care must be exercised to insure the rail is heated to a minimum of 90 deg. before the rail anchors are reapplied.
- (h) If the rail temperature is less than 90 deg. and it is not possible to adjust the rail immediately to that temperature by heating, the following procedures will be followed:
 - (1) Cut the rail or remove the joint bars at the location of maximum displacement, after lining the track as necessary to insure all pressure has been removed.
 - (2) Align track and bypass rail ends.
 - (3) Remove all rail anchors for 300' and adjust expansion, making certain the rail does not bind on tie plates, spikes, etc.
 - (4) After rail expansion has been adjusted evenly throughout the 300', reapply the rail anchors making sure they are all tight against the ties.
 - (5) Line track back to proper location and make additional cuts on the rail as necessary.
 - (6) The area adjusted will be protected by a maximum of 10 m.p.h. slow order until the rail expansion is adjusted to the range above 90 deg. with or without heating.
- (i) Rails, which have been torch cut during the corrective procedure will be removed from track promptly, and protected by a maximum 10 M.P.H. slow order until removed.
- (j) A new heat record will be prepared on the appropriate form with the new adjusted temperature. The track supervisor will forward one copy to his immediate superior and one copy to the Principal Engineering Officer; he should retain a copy for his record. It should be noted on the form if the adjustment was made by use of a heater or natural temperature change, and also that all anchors were removed in order to make the required adjustment.

**SEC. 119.10 INSPECTION OF JOINTS IN TRACK CONSTRUCTED WITH
CONTINUOUS WELDED RAIL. (12/23/05)**

(a) General

- (1) As of January 1, 2006 a precise location / identification of all joints on track constructed with continuous welded rail will be administer by the track supervisor. This information will be foundation for CWR RAIL JOINT INSPECTION FORM. (This inventory of joints in CWR territory must be completed by February 17,2006)
- (2) All inspections of rail joints in CWR will be made on foot. This inspection is not limited to only the integrity of the joint bar but its fit against the rail the inspector must also take account the condition of the track structure adjacent to the joint, some examples of inspection essentials:
 - a) Joint bars with visible or detectable cracks.
 - b) Bolt condition: loose, bent or missing.
 - c) Condition of the rail; rail end batter, mismatch in the railhead or any other condition that could likely contribute to failure of the rail joint under dynamic loading.
 - d) Evidence of excessive rail movement: Is there evidence of longitudinal rail movement. Inspectors must take note of the condition of the cross ties and ballast supporting the joint.
- (3) The Rail Joint Inspection Form must comply with 49 CFR 213.241(b). Therefore, the Rail Joint Inspection Form must contain the inspectors name and signature, the date of the inspection, the location of the joint and identify the character of the defect along with the remedial action taken by the inspector. The Rail Joint Inspection Form will be maintained in the Track Supervisors office, as are all other records found in 49 CFR 213.241(b). These records of Rail Joint Inspection will be made available for copy to the FRA for a period of one year, following the inspection
- (4) Rail Joint Inspections must be taken when the rail is at or near its neutral temperature and when out of face surfacing operations are performed, or if dragging equipment strikes the side of the rail joint. As a minimum, two inspections will be done annually, the first in early spring (March or April) then again in late fall (October or November).
- (5) There are a number of Rail Joint Defects that require comprehensive remedial action, which may be the result of localized conditions these rail joint defect location must be brought to the attention of the Track Supervisor. Nonetheless the following defects will have specific remedial action.
 - a) Rail Joints cracked or Insulated Joints where there is evidence of loss of insulation and indications of fracture in the metal. It must be determined that the tie condition effectively supports the joint, and the ballast condition supports the dynamic loading of rail traffic, and with the assertion that the ambient temperature would not radically affect longitudinal rail movement, then the joint may be replaced within a reasonable period of time. (Not to exceed 7 calendar days).
 - b) Center broken rail joints or insulated joints with insulation missing and any crack between the center two bolt holes must be replaced as soon as possible. (a.s.a.p. immediately). Immediately meaning that if you do not have the joint and the support personnel a protective slow order may be initiated until the necessary men and material required to replace the joint can be assembled. nevertheless, in all cases the joint must be repaired before the end of the day or before the passage of the first train.

SEC. 121.0 BOLTED RAIL JOINTS

(a) General

- (1) Bolted rail joints consist of either head free or head contact standard bars and head contact compromise joint bars held in position by track bolts.
- (2) Head free bars must have the inner surface of the head of the bar held tightly against the railhead fillet with the heel of the bar standing out the proper distance from the base fillet, where all of the draw-in for wear is concentrated.
- (3) Head contact bars must have the top surface of the bar held tightly against the fishing surface under the railhead but away from the railhead fillet area. Bars must be secured in a vertical position to avoid cocking.

(b) Application

- (1) Joint bars shall be applied with their full number of bolts, nuts and spring washers in accordance with standard plans and specifications.
- (2) New bolts, nuts and spring washers should be used when new or reformed joint bars are applied or renewed out-of-face.

(b1) Application of Head Free Joints

The following procedure should be followed in applying head free joint bars:

- (1) Set bars in position, insert all bolts and apply spring washers and nuts by hand.
- (2) Tighten the No. 3 and No. 4 nuts without fully tightening to avoid locking the bars in an improper position. Strike the bead on the heads of both inside and outside bars at both ends with a hammer to force the inside faces of bars tightly against railhead fillets. Do not strike the toe of the bar, as this tends to force the head of the bar outward. Snug the remainder of bolts, working from center of joint bars outward. During this final tightening, drive the toes of the bars inward by tapping with a spike maul or sledge. By following the above procedure, proper contact will be obtained between inner face of head of bar and the railhead fillet. Also, the heel of the bar will stand out the proper distance from the rail base fillet.

(b2) Application of Head Contact Joints.

The following procedure should be followed in applying head contact joint bars:

- (1) Set bars in position on rail, insert all the bolts and apply spring washers and nuts by hand.
- (2) See that bars are in a vertical (un-cocked) position as one of the center bolts is tightened by tapping toes of joint bars as bolt is tightened.
- (3) Tighten all bolts working from center of joint bars toward ends, tapping the toes of joint bars with a spike maul or sledge so that their vertical position is maintained.

(c) Maintenance

- (1) To avoid chipping or spalling under service due to overflow of steel, the rail end faces should be cross cut by grinding with a 1/8" wheel to a depth of not less than 3/16" below the surface of the head. The maximum cut should not be wider than 1/8". If the rails are not in contact, the overflow metal should be removed from both ends by grinding 1/16" from the ends of both rails.
- (2) When bolted joints are applied, other than insulated joints, the bolts should be tightened at the time they are applied, and retightened within a reasonable time after application.

SEC. 121.2 INSULATING RAIL JOINTS

(a) Position

For new work or rail renewals in track circuit territory, insulating joints shall be located as follows:

- (1) Where track circuits adjoin within limits of interlocking, in cab signal territory, electrified territory or in territory where stray current is likely to be prevalent, insulating joints shall be staggered not more than 56 inches nor less than 32 inches.
- (2) To provide for effective electric locking, insulating joints, staggered as prescribed in paragraph (1) above, shall be located with respect to signals as follows:
 - (a) No insulating joint shall be placed less than 5 feet nor more than 13 feet in advance of a high signal, except that where there are opposing high signals at the same location, the insulating joints shall be placed as nearly opposite the signals as practicable.
 - (b) Insulating joints shall be placed as nearly opposite dwarf signals as practicable.
- (3) At locations other than those listed above, insulating joints may be staggered not more than 10 feet.
- (4) Insulating rail joints need not be specially staggered at the end of track circuit where there is no adjoining track circuit or fixed signal.
- (5) Insulating rail joints in turnouts and crossovers, and at highway grade crossings shall be located in accordance with Standard Signal Plans.
- (6) Insulating rail joints located in accordance with former specifications need not be relocated until rail is renewed.

(b) Application of Continuous Insulating Joints.

- (1) An insulating joint should not be applied to rails with battered or rough cut edge, as they will damage insulating fibers. Such edges which come in contact with the fiber parts of the joint, i.e., under the rail, web and top and bottom of the rail base should be rounded to approximately 1/8-inch radius by grinding or filing.
- (2) Rails should be spaced so the ends will bear firmly against fiber end post to avoid damage to bolts and fiber bushings. If the opening between rail ends is too small, the rail ends should be forced apart with an approved rail expander. Use of a track chisel or wedge may leave rough edges that will destroy the insulating material. The end posts should not project above or beyond railheads.
- (3) Ties, preferably three under each continuous type insulating joint 36 inches or more in length, should be spaced and tamped to provide uniform support. Parkway outlets ("boot legs") should be moved if they would interfere with arranging ties accordingly.
- (4) Abrasion plates must be used under continuous insulating joints.
- (5) Before insulating joints are applied, the parts of the rails to be covered by the insulating joint should be thoroughly cleaned to remove all rust, scale and dirt. All metal parts of the joint should be thoroughly cleaned, and all surfaces of fiber head and base pieces, and adjoining inside surfaces of rail and joint bars, liberally coated with approved rust preventative before application.
- (6) First insert the end post. Then apply the fiber base plates and metal joint bars to each side of the rails and drive them on the rails with a sledge or hammer, striking only the lower edge of the bars until there is just enough room left to insert the fiber head pieces. After the fiber headpieces are in place, insert fiber bushings in bolt-holes, and apply the fiber washer plates and metal washer plates with the bolts and nuts. Before placing bolts in the joints, they should be dipped in approved grease, thoroughly coating the entire length of bolt except the head. Joint bars should be drawn into position by alternately driving with a sledge or hammer along the base of one bar and tightening the nuts by hand wrenches, beginning with the two center bolts and progressing to the end bolts, and then proceeding in the same manner on the other joint bar. This procedure must be followed to avoid "cocking" the bars. Do not drive the head of the bars. They will be drawn into place by bolt pressure. Bolts in continuous insulating joints must be kept sufficiently tight at all times to prevent movement of the rail in the joint.

- (7) A bolt should never be driven through a fiber bushing, as it will destroy the bushing. If rails and joint parts are in correct relative position, and the bolt-holes lined up, the bolts can easily be inserted by hand.
- (8) Continuous insulating joints require more frequent and careful attention than conventional joints. Bolts should be tightened within three days and again within a month after joints are applied. While tightening, bars and bolt heads should be tapped with a hammer to insure proper contact in fishing spaces.

(c) Application of Bonded Insulating Joints.

- (1) Bonded insulating joints should be used in CWR track, except on the turnout side of turnouts where conventionally bolted insulating joints should be used.
- (2) Rails connected by bonded insulating joints must be field welded in place.
- (3) All bonded insulating joints are to be installed as suspended joints.
- (4) Double shoulder tie plates must be used on the two ties under bonded insulating joints.
- (5) Rail holding spikes must be carefully driven to assure that spike head is not left in contact with the bar, which could result in the joint being short-circuited. All bonded insulating joints will have place holding spikes installed.
- (6) No attempt should be made to tighten bolts in bonded insulating joints. In the event the bolts in the joint becomes loose, the track or signal supervisor should be notified for further handling.
- (7) Any railhead overflow at a bonded insulating joint is to be removed by the use of a hand file or hacksaw. Extreme care must be exercised to assure that the end post is not damaged. The overflow should be removed only to the rail end, so that the joint gap will not be greater than the original 3/16 inch. A cross grinder should not be used to remove the overflow.
- (8) No additional rail anchors will be required at bonded insulating joint locations in CWR. The bonded insulating joints will be considered as butt-welded rail-joints for purposes of compliance with the requirements of Sec. 125.

(d) Care of Joints

Insulating joints should be supported on sound smooth ties, well tamped and well drained with clean ballast at all times.

SEC.123.0 TIE PLATES

SEC.123.1 USE

- (a) Tie plates shall be installed under running rails on all wood cross ties, switch ties and bridge ties.
- (b) Only double shoulder tie plates should be used under CWR.

SEC.123.2 PLACEMENT

- (a) Tie plates shall be installed so that the rail cants towards the centerline of track.
- (b) Tie plates must be placed square to the base of the rail and no portion or part of the shoulder can be under the base of the rail. Compliance with 213.123(b).
- (c) Tie plates should be centered over the tie so that the plate does not project over the edge of the tie.

SEC.123.3 TIE PADS

- (a) Tie pads may only be used with the approval of the Engineer of Track.
- (b) Elastomeric tie pads should be used on concrete ties.

SEC.125.0 RAIL ANCHORS

SEC.125.1 NUMBER REQUIRED

- (a) A sufficient number of anchors must be applied and in a manner to effectively control longitudinal rail movement.
- (b) The number of rail anchors required to control longitudinal rail movement in excess of the minimum number of anchors for a given location and/or localized condition, can be fixed only by experience and judgment, and is to be determined by the Supervisor of Track with approval of the Chief Engineer. Insufficient anchors applied in areas where it would be necessary to install more than the minimum number of anchors, in order to restrain longitudinal rail movement, may result in improper distribution of expansion allowance, or stresses in CWR, and consequent distortion of line and surface, which can create a hazardous condition.
- (c) Additional anchors must be applied when there is evidence that rails are moving progressively under traffic.
- (d) It should be recognized that when track is raised out-of-face, the resistance to creepage is reduced and additional anchors may be required in order to avoid undue movement.
- (e) In general, main line higher speed track requires eight (8) anchors per 39 feet of rail applied against movement in the normal direction of traffic. Additional anchors against reverse movements may also be required. For tracks of lesser traffic, including main tracks of branch lines therefore from 4 to 6 anchors per 39 feet of rail or even less may be sufficient.
- (f) On single track, or on other tracks having traffic in both directions, a sufficient number of anchors shall be applied in each direction to stabilize the rails, and in addition, to preventing progressive movement in one direction, to prevent backward and forward movement of ties and resultant disturbance of tamping.
- (g) When anchoring rails greater than 39 feet and up to 160 feet in length, additional anchors are required because of the relative reduction in the expansion allowance per foot of track. A minimum of 24 anchors per 78 feet of rail in the normal direction of traffic (more or less in proportion for other lengths) with one fourth (1/4) of the anchored ties boxed for reverse anchoring is needed in order to restrain the tendency of such track to gain expansion.

- (h) The minimum number of anchors to be applied when CWR is laid and subsequently maintained is prescribed as follows:
 - (1) Fully box anchor every wood tie 200' in each direction from:
 - (a) Ends of CWR strings
 - (b) Non-bonded insulated joints
 - (c) Turnouts and crossovers
 - (d) Track crossings
 - (e) Public and Private crossings with non-bonded insulated joints.
 - (f) Hot Box Detectors
 - (2) Fully box anchor every other wood tie:
 - (a) Through the remainder of CWR strings.
 - (3) Omit rail anchors entirely in the roadway areas of Public and Private Crossings.
 - (4) If train operation necessitates that CWR be worked in a manner contrary to the provisions above, the track shall be protected by a slow order, until these provisions have been complied with.
- (i) Rail anchors shall not be used on open deck bridges, trestles or viaducts, except where the deck and bridge meet the requirements of Sec. 119.1(b) or their use is approved by the Chief Engineer.
- (j) Rail joints in CWR which are created and installed in other than the winter season and scheduled for subsequent welding, must be fully anchored according to SEC.125.1(a). If the welds are not made and the joints removed prior to the next winter season, they must be fully anchored according to procedure SEC.125.1(ab) and SEC.125.1(h).

SEC.125.2 APPLICATION

Rail anchors shall be applied as follows:

- (a) Rail anchors shall be applied at both ends and on the same side of the tie. They should be spaced throughout the rail length as evenly as practicable. Where practicable rail anchors shall be applied from the gage side of the rail.
- (b) When laying rail, the necessary anchors shall be applied before trains are permitted to pass over track unless protected by slow order.
- (c) Rail anchors shall be applied against sound ties.
- (d) Drive on type rail anchors shall be applied, from the field side of the track, to the stock rail with the exception of the rail adjacent to the switch point.

SEC.125.3 MAINTENANCE

- (a) Rail anchors must have full bearing against the tie or tie plate when applied.
- (b) In order to avoid damage to rail anchors, only proper tools or machines should be used in applying and removing.
- (c) When the bearing of rail anchors against the tie is disturbed, when renewing or respacing ties or moving rail, the rail anchors must be mechanically shifted or taken off and then reapplied in proper position. All anchors removed must be reapplied before track is restored to service, replacing any broken anchors and adding additional anchors, if necessary.

SEC.125.4 ASSIGNMENT

The use of rail anchors should be in accordance with the following service assignment:

- (a) Use new or reformed anchors in laying:
 - (1) New bolted or continuous welded rail.
 - (2) Continuous welded relay or fit rail.
- (b) Use fit rail anchors if available in:
 - (1) laying bolted relay or fit rail.
 - (2) Applying additional or replacement anchors without restriction.
 - (3) Continuous welded rail or new bolted rail only when approved by the Principal Engineer.

SEC.127.0 TRACKFASTENERS

SEC.127.1 NUMBER REQUIRED

- (a) The requirements of F.R.A. SEC. 213.127 must be satisfied as to minimum number and location of effective track fasteners.
- (b) When cut steel track spikes are used in track constructed with wood crossties, each rail, unless otherwise ordered by the Chief Engineer, shall be fastened to every tie by the following number of spikes:

	Rail holding spikes	Plate holding spikes
Track		
(1) 5,000,000 or less gross tons of traffic per year:		
Tangents and curves under 3 degrees.....	2	0
Curve 3 degrees and over...	2	1
(2) Over 5,000,000 gross tons of traffic per year:		
Tangents.....	2	0
Curves under 3 degrees.....	2	1
Curves 3 degrees and over..	2	2

SEC.127.2 APPLICATION

- (a) All spikes shall be driven with the head pointed towards the rail, except spikes against sides of all joints, especially bonded and polyurethane coated steel insulated joints shall be driven with the head pointing away from the rail and not be in solid contact with the joint bars.
- (b) Spikes should not be driven at ends of insulated joints in any manner that would cause insulated joint to become electrically connected to the rail.

- (c) Spikes must be started vertically and square, and driven straight. The shank of rail holding spikes must have full bearing against the base of the rail, care must be given not to overdrive spikes.
- (d) Care must be taken not to strike the rail, its fastenings or signal appliances when driving spikes.
- (e) Spikes in main tracks, when throat cut or deteriorated due to rust, should be replaced.
- (f) All old spikes when pulled, shall be picked up, sorted and returned for reuse, if applicable, or scrapped.
- (g) On open deck bridge structures, when the head of the track spike is broken off, the replacement spike should be inserted in a new location, leaving the spike stub in the tie. If a new spike location is not available, the spike shall be driven completely through the tie so as to avoid shunting the track circuit.
- (h) All old spike holes shall be plugged prior to re-spiking.
- (i) Lock spikes shall be driven in accordance with applicable standards so that the closed portion is facing the rail.
- (j) Lock spikes are only used for plate holding spikes.

SEC.132.0 TRACK CROSSINGS

SEC.132.1 USE

As of this writing there are only two tracks crossing locations maintained by the Springfield Terminal Railroad.

- (a) Crossings shall be used as approved by the Principal Engineering Officer.

SEC.133.0 TURNOUTS AND CROSSOVERS

SEC.133.1 USE

Turnouts and crossovers are designated by their frog numbers and should be used as follows:

- (a) No.20 At interlocking plans for crossing over from one main track to another main track where the normal passenger speed is 50 MPH or more.
- (b) No. 15 At interlocking plants for crossing over from one main track to another main track, where conditions do not justify or afford the distance required for No. 20 frogs. Or for diverting trains to sidings or other tracks and returning trains to main tracks through power operated or spring switches.
- (c) No. 10 For all other turnouts from main tracks and sidings where practicable, and in yards and terminals where road locomotives operate.
- (d) No. 8 For turnouts where the use of a No. 10 frog is not practicable.
- (e) Turnouts greater than No. 20 or smaller than No. 8 must be approved by the Principal Engineering Officer.

SEC.133.2 SPEEDS THROUGH TURNOUTS

- (a) The following tables show speeds through level turnouts giving riding conditions equivalent to those obtained in traversing a curve elevated 3 inches less than that required for equilibrium. Note: Speeds through turnouts with either straight or curved switch points are calculated from the equation $E=0.0007 \times V^2 \times D^3$, where D equals the degree of curvature of the closure curve or the switch curve, whichever is sharper; for turnouts with straight switch points, D for the switch point curve is the degree of curvature of a curve having a central angle equal to the switch angle and a chord length equal to length of the switch points.

TURNOUTS WITH STRAIGHT SWITCH POINTS (AREMA)
(Speed in Miles per Hour)

<u>Turnout Number</u>	<u>Length of Switch points</u>	<u>lateral turnouts</u>	<u>Equilateral Turnouts</u>
8	16'6"	19	27
9	16'6"	20	28
10	16'6"	20	28
11	22'0"	26	37
12	22'0"	27	38
15	30'0"	36	51
18	30'0"	36	52
20	30'0"	36	52

TURNOUTS WITH CURVED SWITCH POINTS (AREMA)
(Speed in Miles per Hour)

<u>Turnout Number</u>	<u>Length of Switch points</u>	<u>lateral turnouts</u>	<u>Equilateral Turnouts</u>
6	13'0"	15	21
8	13'0"	20	28
9	19'6"	22	30
10	19'6"	28	35
11	19'6"	28	39
12	19'6"	29	40
15	26'0"	38	53
20	39'0"	50	70

- (b) When turnouts or crossovers are located in curved tracks, speeds must be adjusted to agree with Part 213.57 of the FRA Track Safety Standards.

SEC. 133.3 INSTALLATION

- (a) Turnouts and crossovers constructed in track or at the site shall be built to and conform to Standard Plans.
- (b) Prefabricated turnouts shipped in panels in accordance with approved plans may be used where economical.
- (c) As far as practicable, when being constructed or renewed in existing main tracks, turnouts should be completely installed with switches connected to their operating mechanisms and properly adjusted before trains are permitted to move over the turnout.
- (d) Where only one switch rail (closed point) has been installed in a turnout under construction or renewal in existing main track, and it is necessary to move trains over the turnout on the main track, the following precautions must be taken:
 - (1) All switch plates on the turnout side must be fully spiked in correct position.
 - (2) The main track switch rail must be securely held against its stock rail by driving a spike in each of the first two ties back of the point, and where possible, spikes must pass through holes in the switch plates.
 - (3) The free end of stock rail must be fastened to prevent movement.
 - (4) Facing train movements shall be made only under slow speed restriction.
- (e) The main track guardrail must be correctly placed and spiked, if the frog has been installed.
- (f) Unconnected ends of lead rails or the toe of frog should be protected.
- (g) Where track is signaled, a switch circuit controller shall be installed by a C&S employee in accordance with the C&S plans.
- (h) To the extent practicable, avoid placing turnouts and crossovers on curves, particularly on spirals or elevation runoffs at the ends of curves.
- (i) Where turnouts are located in elevated curved tracks, elevation in track behind the frog must be run off at a rate not exceeding 1/2 inch in 31 feet.

SEC. 133.4 MAINTENANCE

- (a) The fastenings in turnouts and track crossings must be intact and maintained so as to keep the components securely in place. Also, each switch, frog and guardrail must be kept free of obstructions that may interfere with the passage of wheels.
- (b) Tracks must be equipped with rail anchors through turnouts and crossovers, and on each side of track crossings, switches, frogs and guardrails, to restrain movement of rail affecting the position of switch points and frogs.
- (c) Each flange-way at turnouts and track crossings must be at least 1 1/2 inches wide.

SEC. 135.0 SWITCHES

SEC. 135.1 USE

- (a) All switches must be constructed in accordance with Standard Plans.

SEC. 135.2 MAINTENANCE

- (a) Switch rails and movable points of crossings should be kept in good line and surface, and in good order with all bolts tight and cotter pins in place.
- (b) They should fit the stock rails properly, with a full bearing against the head. If a wear pattern indicates bearing only along the top edge of point, corrections should be made by grinding in accordance with standard instruction.
- (c) The running of switch rails and stock rails should be prevented by adequately anchoring the adjoining rails.
- (d) Vertical switch rod bolts must be placed with threaded ends up, and nuts locked by cotter pins.
- (e) Switch plates and movable parts should be kept clean and lubricated. A permanent type of coating may be applied.
- (f) Switch rails shall be replaced or repaired by an approved method when worn or chipped, so that the top at any place is more than 7/8 inch below the plane across the tops of stock rails.

- (g) Switch rails, but not including movable point rails of crossings, shall be replaced when raised portion of switch rail is worn down to the level of the top of the stock rail.
- (h) Each stock rail must be securely seated in switch plates, but care must be used to avoid canting the rail by overtightening the rail braces.
- (i) Each switch point must fit its stock rail properly, with the switch stand in either of its closed positions to allow wheels to pass the switch point. Lateral and vertical movement of a stock rail in the switch plates or of a switch plate on a tie must not adversely affect the fit of the switch point to the stock rail. Immediate protection and prompt corrective action are necessary when a switch point is found to stand open more than 3/16 inch.
- (j) Each switch must be maintained so that the outer edge of the wheel tread cannot contact the gage side of the stock rail.
- (k) The heel of each switch rail must be secure and the bolts in each heel must be kept tight.
- (l) Each switch stand and connecting rod must be securely fastened and operable without excessive lost motion.
- (m) Each throw lever must be maintained so that it cannot be operated and operable without excessive lost motion.
- (n) Each switch position indicator must be clearly visible at all times.
- (o) Unusually chipped or worn switch points must be repaired or replaced. Metal flow must be removed to insure proper closure. Immediate protection and prompt corrective action are necessary when a switch point is found to have an unprotected flat vertical surface 5/16 inch or more in which at a depth of 3/4 inch below the top of the stock rail.

SEC. 135.3 REDUCTION IN WEAR

Approved methods for reduction of unusual wear of switch rails under facing traffic are:

- (a) In main tracks without restriction:
 - 1 Use of heat-treated switch rails.
 - 2 Use of "Samson" design switch rails with undercut stock rails.
 - 3 One quarter (1/4) inch maximum depth recess in the gage side of stock rail, in accordance with standard instructions, with conventional switch rails. Recesses must not be cut for switch rails unless they are equipped with heel blocks.

- (b) In main tracks, yards and terminals where the maximum authorized speed does not exceed 15 mph:
1. Switch point guard of approved manufacture applied to the outside of stock rail.
 2. Reverse bend (gooseneck) in the stock rail to house the switch rail. Switch rails must be equipped with heel block.

SEC. 135.4 INSPECTION

- (a) Switch rails and parts, and connections, must be examined frequently. It is important that the stock rails have no lateral movement in the switch plates and that switch plates have no movement on the ties. Regular inspections shall be made as required and necessary adjustments made at once.
- (b) Chipping or unusual wear on any switch rail should be investigated, its cause determined and corrective action taken. When wear or chipping has produced a sloping top surface, which may tend to raise a wheel having an imperfect flange, the switch rail should be further examined to locate any point of hard contact, which would necessitate repair or replacement.
- (c) The requirements of FRA, Track Safety Standards, Part 213.235, as presented in the regulations, must be met as to the minimum frequency of inspection.

SEC. 137.0 FROGS

SEC. 137.1 USE

- (a) Rigid frogs of various angles, as designated by frog number, shall be used with turnouts of the same number.
- (b) The service assignments of the various types of frogs shall be as follows:
- 1 Manganese steel center frogs should be used in heavy traffic and/or high speed tracks.
 - 2 Spring frogs, with permission of the Principal Engineering officer a number 10 frogs may be used in Main Line and Industrial tracks.
 - 3 Carbon steel bolted rigid frogs may be used on branch lines of light traffic at moderate speeds and in yard tracks where fit manganese frogs are not available, and where it is known that they will give satisfactory service.
 - 4 Self-guarded frogs should be used, where practicable, where speed does not exceed 15 mph.

SEC. 137.2 MAINTENANCE

- (a) All fins and lips of flowed metal should be ground from frogs promptly, and the gage and guard edges of castings rounded.
- (b) All bolts must be kept tight and broken bolts renewed immediately.
- (c) Consideration should be given to repairing worn frogs in track by approved method of welding and grinding.
- (d) When their condition warrants, frogs not fit for main tracks should be used in yards and other slow speed tracks.
- (e) All frogs requiring repairs, which cannot be made in track, or at the site, shall be shipped to the destination point for reclamation.

SEC. 143.0 FROG GUARD RAILS

SEC. 143.1 GENERAL

Guardrails shall be furnished in accordance with standard plans and specifications or manufacturer's designs approved for use by the Chief Engineer.

SEC. 143.2 USE

- (a) "Hook Flange" type guard rails of the braced design and one-piece manganese type guard rails of cast high manganese steel, marked manganese, MS or M, may be used without restriction in main tracks, including turnout side of main track crossovers. The one-piece cast manganese type is particularly desirable at locations where abrasive action is severe.
- (b) "Hook Flange" type, bolted "tee" type or fit or repaired one-piece manganese type guard rails should be used in light traffic, branch line main tracks with moderate speed, and in yard and side tracks where self-guarded frogs are not used.
- (c) Bolted "tee" type guardrails may be used in main tracks of main lines and important branches only where guardrails of unusual dimensions are required to suit special conditions.

SEC. 143.3 LENGTH

- (a) The following table indicates the lengths of "Hook Flange" type guardrails that should be used with designated frogs:

Frog Number	Length of Guard Rail
20	13 ft.
15	13 ft.
10	9 ft.
8	9 ft.
6	9 ft.

- (b) The length of guardrails of the "tee" type for use in yard and sidetracks, and main tracks as specified in Sec. 143.2(b), shall not be less than 11 feet.
- (c) "Tee" guard rails not less than 14 feet long should be used on the inside of curves 13 degrees or over to lessen the flange wear on the toe rail of the frog.
- (d) Guardrails installed in accordance with previous standard practice may be continued in general use until their replacement becomes necessary.

SEC. 143.4 GAGE AND DISTANCE

- (a) Maintenance limits:

- 1 Frogs guardrail gage for turnouts in track must not be less than prescribed in FRA Track Safety Standards, Part 213.143.
- 2 The back-to-back distance between guardrail and frog rail may not be more than that required by FRA Track Safety Standards, Part 213.143.

- (b) Installation dimensions:

The distance from wheel flange face of guardrail to the gage line of frog point must be as follows:

- 1 One-piece manganese and "Hood Flange" type guard rails of braced design 4 feet 6 5/8 inches, except where curvature exceeds 8 degrees it must be 4 feet 6 3/4 inches, regardless of track gage and in accordance with Standard Plans.
- 2 "Hood Flange" and "tee" guardrails must be 4 feet 6 3/4 inches, unless otherwise specified.

The distance between wheel flange face of guardrail and the wheel flange face of frog wing rail (back-to-back) must not exceed 4 feet 5 inches.

SEC. 143.5 APPLICATION

- (a) Guardrails should be set as follows:
 - One-piece cast guard rails and "Hood Flange" type of braced design in accordance with Standard Plans.
 - 2 "Tee" guardrails and "Hook Flange" guardrails without braces shall be set in accordance with Standard Plans.
- (b) The end of guardrails should be placed upon a tie or be otherwise protected, so that no loose or dragging object may become hooked on the guardrail ends.

SEC. 145.0 INNER BRIDGE GUARD RAILS

SEC. 145.1 GENERAL

- (a) Where inner bridge guardrails are required, they must be properly installed and maintained to prevent serious structural damage, with possible failure of bridge, in the event of a derailment. Installation of inner guardrails on structures should be held to a minimum to eliminate the extra maintenance needed, and to permit proper surfacing, lining and economical renewal of ties on bridge approaches. Where existing guardrails do not meet the above requirements, installations or removals should be made the next time the track is worked through the area.
- (b) A "single" guardrail is a continuous line of rails fastened to ties adjacent to the gage side of one running rail. A "full" guardrail consists of two such lines of rail, one adjacent to the gage side of each running rail.

SEC. 145.2 USE

The use of inner bridge guardrails shall be, as follows:

- (a) Thru truss bridges and structures supported on piers or on bents that may be struck by derailed equipment with possible failure of the structure, i.e., where piers or bents have considerable batter or extend beyond the bridge trusses due to angular crossing of road, stream, etc.:
 - 1 Single track Full guardrail.
 - 2 Double track Single guardrail in each track to deflect derailed wheels away from adjacent truss.
 - 3 Three or more tracks single guardrail in each outside track to deflect derailed wheels away from adjacent truss. No guardrail is to be placed on other tracks.

- (b) Movable bridges: Full guardrail in each track.
- (c) Special and large structures:

Note: Installation of guardrails must have the approval of the Principal Engineering Officer.

SEC. 145.3 MATERIAL

- (a) Preferably, scrap rail will be used, of such section that the top of guardrail is approximately 1 to 2 inches below the top of running rail.
- (b) Joints may be either 4 or 6 hole bars with a minimum of 4 bolts, without washers, per joint.
- (c) No tie plates or braces will be used with inner bridge guardrails.

SEC. 145.4 APPLICATION

- (a) Inner guard rails shall extend a sufficient distance (approximately 30 feet) beyond the bridge back-walls on either side to have the guard rails parallel to and 11 inches from the gage of running rails throughout the entire length of the structure to be protected.
- (b) Full guard rails shall end on a tie in the middle of the track, with the ends beveled, bent down or fitted with a proper end casting, so as to divert a derailed wheel — without catching dragging equipment.
- (c) Single guard rails shall end on a tie, approximately 12 inches from the gage of the outside running rail, and beveled or bent down so as to avoid catching dragging equipment.
- (d) To facilitate diverting derailed wheels, the guardrail shall be lined to a smooth uniform curve and/or tangent from bridge backwall to the guardrail end.
- (e) Inner guardrails must be installed to protect the structure from traffic on both directions on that track.
- (f) Inner bridge guardrails will be spiked on each cross tie or bridge timber with one spike on each side of the rail or casting, spikes being offset from each other to avoid splitting timber. Spike holes should be pre-bored.

SEC. 145.5 INSPECTION

Inner guardrails shall be inspected periodically to make certain that bolts and joints are tight, spikes firmly against base of rail, and castings fastened securely to rail ends, or ends properly beveled or bent down.

SEC. 201.0 SWITCH OPERATING MECHANISMS

SEC. 201.1 USE

Switches shall be operated by approved types of mechanisms.

SEC. 201.2 SPRING SWITCHES

- (a) Specially reinforced switches are used with slow acting spring switch mechanisms.

SEC. 201.3 APPLICATION OF SWITCH STANDS

- (a) Manually operated switch stands shall be placed so that the operating rod is in tension when the switch is set in normal position in main track, and at the siding end of crossovers between main track and siding.
- (b) Each switch in a crossover shall be equipped with a switch
- (c) Where crossover switches are protected by signals, a switch locking arrangement shall be provided in accordance with Standard Signal Plans.

SEC. 201.4 LOCATION OF SWITCH STANDS

- (a) Switch stands, except locking switch stands, with or without switch point position indicators, and stands for indicators must be placed so that the distance from the gage of nearest rail to the center of spindle will be:
1. With low mast and placed between tracks whose center to center distance is:

Track Center Distance	Minimum distance from gage to center of spindle.
12'2"to13'0"	3'83/4"
13'0"or more	4'1"
 2. For stands when not between tracks, a minimum distance from gage to center of spindle:

With low masts	4 ft. 1 in.
With intermediate or high masts	7 ft. 0 in.
 3. Where switches are so close together that switch position indicators, if of the same height, would not be separately visible from the locomotive cab, one stand should be placed further from the track than the other, preferably by a distance of 18 inches where track center distances permit.
- (b) "Locking switch stands" shall be placed so that the centerline of the lock bar is 30 inches from the gage of the stock rail for a Wabco Style T20 and 42 inches for a G.R.S. Model 9.

SEC. 201.5 PADLOCKS

- (a) At all non-interlocked main and secondary track switches, throw levers of switch stands shall be secured by latches and locked by a standard switch padlock. The padlock is to be fastened by a chain to the switch stand or tie.

SEC. 201.6 MAINTENANCE

- (a) Switches, switch stands and operating rods must be examined frequently. Broken, damaged or missing parts shall be renewed immediately.
- (b) Regular inspections shall be made as required. If necessary, corrective action must be taken immediately.
- (c) Worn switch latches must be replaced before the wear is sufficient to permit the switch to be opened without removing the padlock.
- (d) The requirements of FRA Track Safety Standards, Part 213.235 must be met in maintaining and inspecting switch stands.

SEC. 202.0 SWITCH POINT POSITION INDICATORS

SEC. 202.1 GENERAL

- (a) Switch point position indicators are used to give a clear and distinct indication of the position of switch points on non-interlocked switches.

SEC. 202.2 APPLICATION

- (a) Targets shall be set at right angles to the track and be perpendicular to the head ties.

SEC. 202.3 MAINTENANCE

Switch point position indicators should be kept clean and have uniform brightness and visibility.

**SEC. 203.0 HOT BOX, AEI and DRAGGING EQUIPMENT
DETECTORS**

SEC. 203.1 APPLICATION

Hot Box, AEI and Dragging Equipment Detectors should be placed on tangent track.

SEC. 203.2 TRACK CONDITION

- (a) At all Hot Box, AEI and Dragging Equipment Detector locations, special attention must be given to the maintenance of good gage, surface and line for 100 feet approaching and through the detector to insure that the top of the rail is at proper height with respect to scanners and that the wheels are properly centered with regard to the gage of the track in passing over the detector.
- (b) Rail joints should be at least 5 feet from the transducers.
- (c) The rail on which the transducers are located should be effectively anchored to restrict movement of the rail.

SEC. 203.3 TRACK WORK IN VICINITY

Whenever track work is to be done in the vicinity of the detector, which may affect the vertical or horizontal relationship of the rails with respect to scanners, the C&S Department must be notified so that the device can be re-gaged.

SEC. 203.4 INTERFERENCE BY METAL OBJECTS

Employees must be careful not to pass any iron or steel object closely over transducers (coils that are mounted on the side of the rail) between the time that a train has passed over the detector and until the train has passed the home signal in advance to avoid possibility of causing home signal to display stop aspect in face of the train.

SEC. 205.0 DERAILS
SEC. 205.1 POSITION

The "Normal" position of a derail shall be to derail wheels of rolling equipment. The "Reverse" position shall be to leave the rails unobstructed for free movement of the equipment.

SEC. 205.2 USE OF DERAILS

Derails shall be used as follows:

- (a) In main tracks, secondary tracks, controlled sidings and sidings, only where required by Federal or State Authorities or where authorized by the Chief Engineer.
- (b) In all other tracks connected with main tracks except:
 - 1. Where on account of ascending grade and/or other local conditions there is no possibility of rolling equipment drifting beyond a determined point of safety, which shall be indicated by a yellow stripe, about 10 inches wide painted on the inside and outside of head, web and base of both rails, which must be kept clear of dirt and weeds, and repainted as often as necessary. (In determining the ascending grade that will prevent equipment from drifting beyond the point of safety, grades on the entire track must be considered. Wind pressure will cause rolling equipment to move against any ascending grade less than 0.5 percent.)

SEC. 205.3 TYPES OF DERAILS

- (a) Derails are generally of two kinds, the "split switch" and the sliding or hinged "block" type.
- (b) Where derails are prescribed, the split switch type shall be used as follows:
 - 1 Within interlocking limits, in main tracks and in secondary tracks.
 - 2 At non-interlocked and non-signaled branch line junctions.
 - 3 In all other tracks where it is possible for the speed of rolling equipment to exceed 15 mph.
- (c) Approved block type derails shall be used at locations other than those in paragraph (b) above, where derails are required.

SEC. 205.4

APPLICATION

- (a) A derail shall be placed a sufficient distance back of the clearance point, not less than 12 feet, to assure that derailed rolling equipment will not foul the main or other protected track.
- (b) Methods for installing block type derails are shown on Standard Plans.
- (c) Where tracks are not parallel at the derail location, or due to other local conditions, it may be necessary to use a deflecting rail to make sure that derailed rolling equipment will not continue moving over the ties to foul the protected track.
- (d) Where deflecting rails are used:
 - 1 The minimum length shall be 18 feet.
 - 2 The nearest end shall be 10 feet from the derail.
 - 3 The flange way opening at the end nearest to the derail shall be 4 inches.
 - 4 The end farthest from the derail shall be set to provide a 12-inch clear opening running rail opposite the derail and the deflecting rail.
 - 5 The deflecting rail shall be of a section and weight not greater than that of the running rails, and preferably less.
 - 6 The deflecting rail should be spiked to every tie with two rail holding spikes, one on each side of the rail base.
 - 7 Neither tie plates nor rail braces are to be used unless special circumstances indicate the need.
 - 8 Existing installation of derails need not be changed to meet these provisions until renewals are otherwise necessary.

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APPENDIX E

CHANGE ORDER FORM

Date of Change Order Issue: _____ Change Order No. _____

Description of Change: _____

Purpose of Change: _____

Justification for Change: _____

Supporting Documentation: _____

Estimated Cost of Change: _____

Impact on Project Completion Date as a result of Change: _____

This document will become a supplement to the CONTRACT and all provisions of the CONTRACT will apply to Change Order Work.

MassDOT Rail and Transit Division and Contractor or Specialty Contractor agree that the price and time adjustment to the CONTRACT are equitable and acceptable to all parties.

Requested by: _____ Date: _____
(Representative of Contractor or Specialty Contractor)

Approved by: _____ Date: _____
(Representative of MassDOT)